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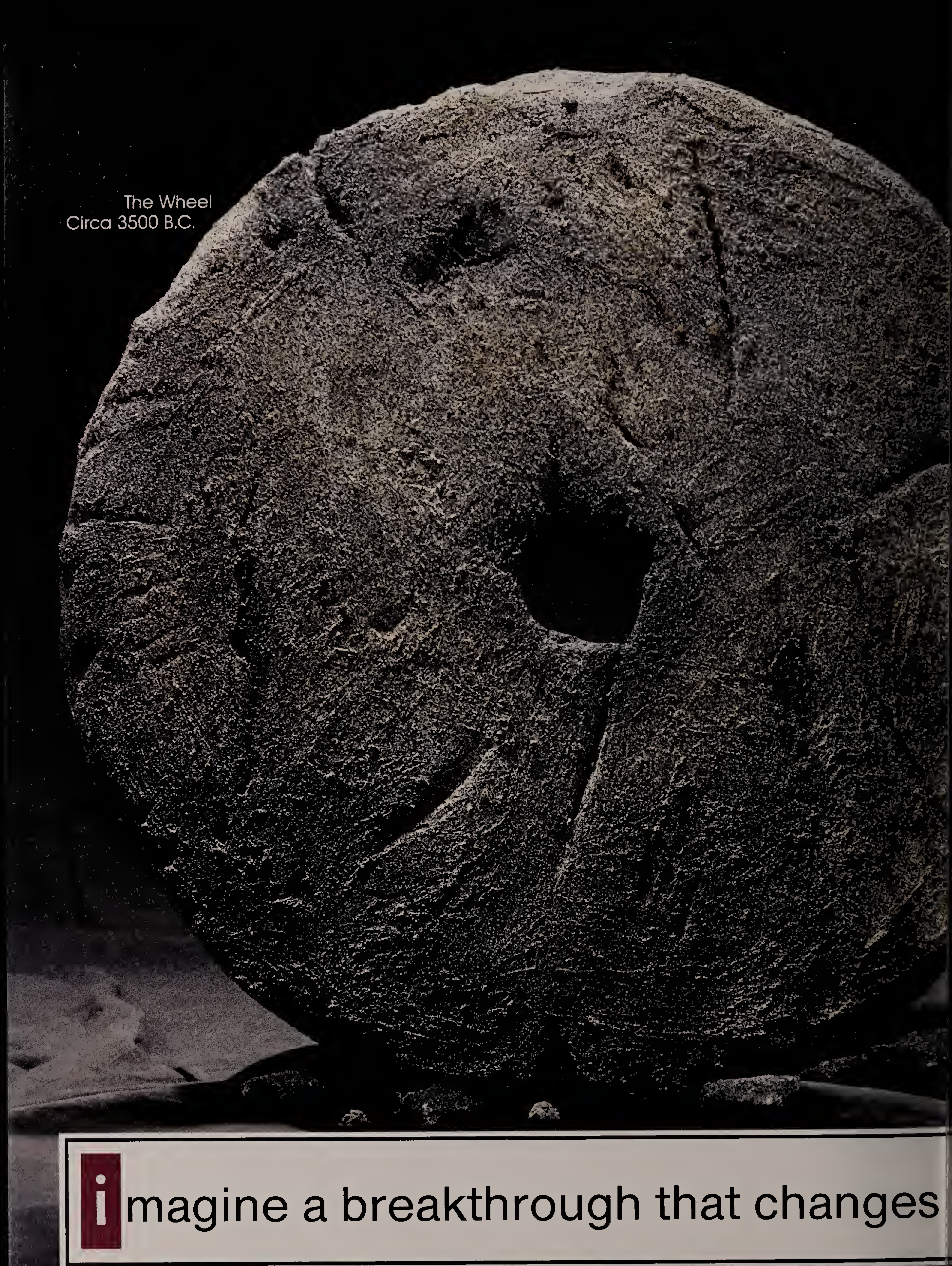

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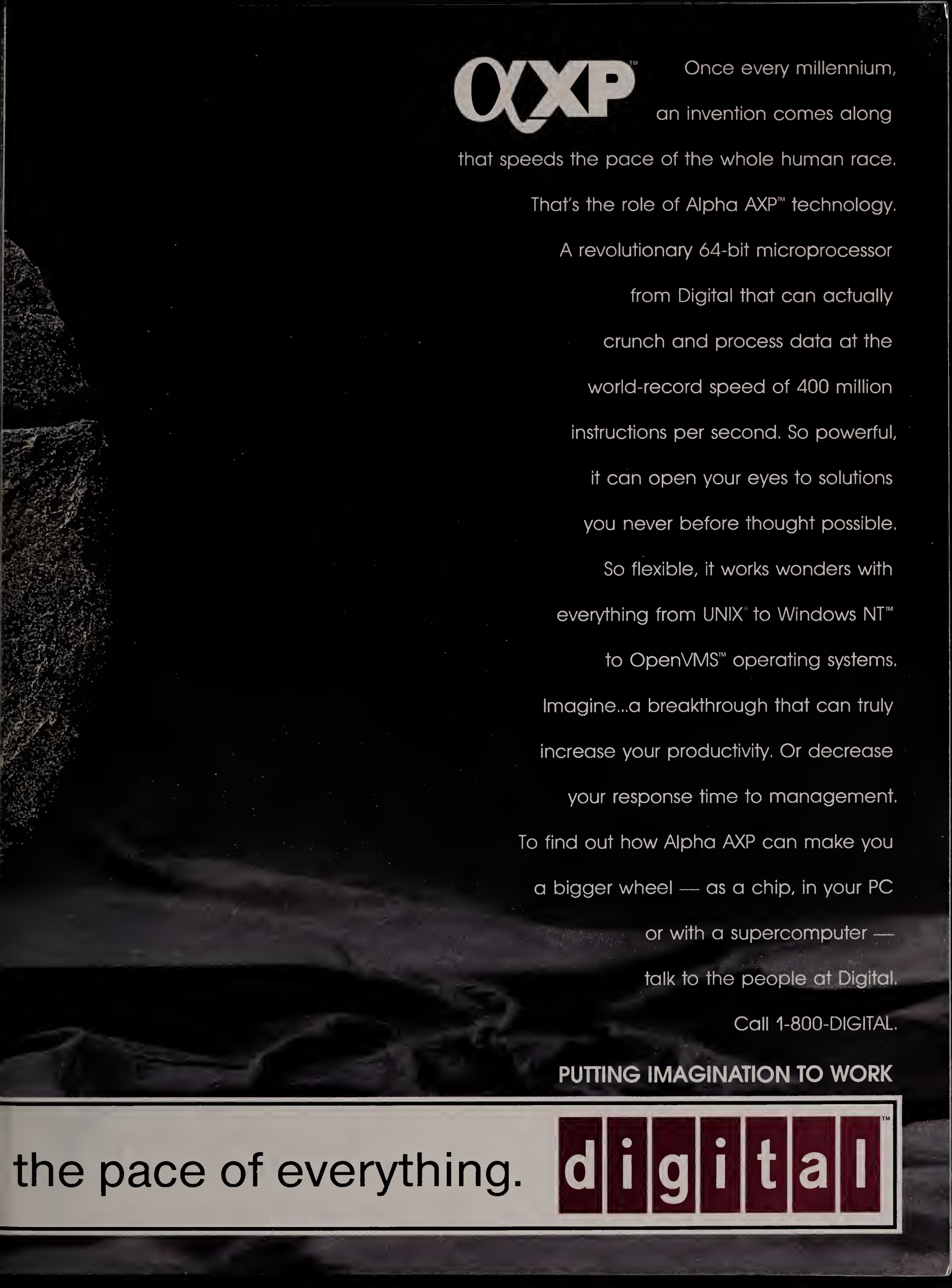

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CIO

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Forget alignment. These days the word is fusion. There's only one plan—the BUSINESS plan—and everyone in the joint should be working from it.

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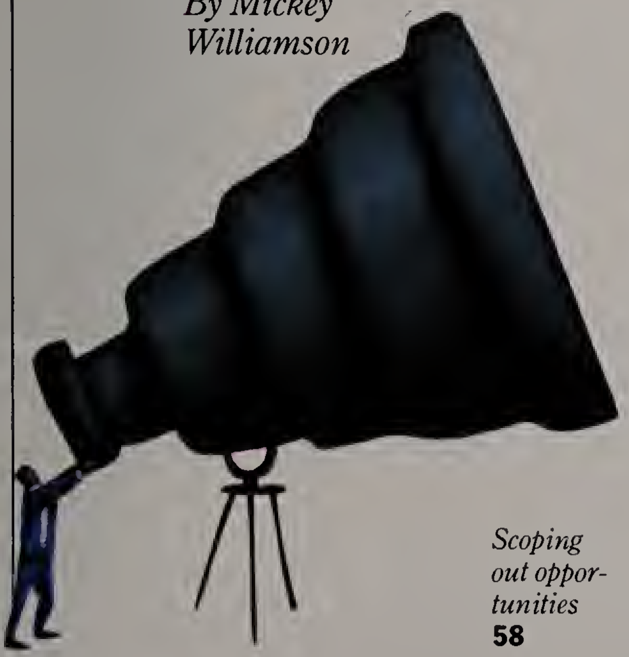

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They're fast, they're flexible and they're the future. Virtual companies are breaking down organizational barriers and building up customer expectations—and none of it would be possible without IT.

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When senior business and IS executives get in harness together, the results can be impressive. SIM's seventh annual Partners in Leadership Award honors the achievements of close cooperation.

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Birds do it **12**

At a recent working-group meeting held by Booz-Allen & Hamilton, someone asked what prevents CIOs from taking their place in the executive suite. Jokingly, one IS executive responded, "a lack of humility"; he continued by saying that lack of credibility was the real nemesis of CIOs.

This month, our Strategic Outlook focuses on high-level business planning and what it takes for CIOs to gain credibility and become an integral part of that process. Contributing Writer Mickey Williamson examines the latest thinking on strategic planning in the series of articles beginning on Page 41. The series explores the actions being taken by many CIOs to secure a place with other executives at those critical strategic-planning meetings.

For the past few years, strategic planning was viewed as aligning IT with business objectives, actions that took place after the corporate planning process had been concluded. But according to some consultants, the talk today is of the fusion of IT with business objectives. This suggests an opportunity for IS executives to become an integral part of the planning effort.

It also means that IS chiefs must choose among corporate entities when creating information systems. Increasingly, CIOs must learn to say no when requested systems do not support corporate objectives, but this assumes they fully understand what the corporate game plan is.

The more information executives can work as partners with business units, the less IS will be seen as strictly a support function. This will help make CIOs more welcome in planning ranks. The key skill for a CIO today is the ability to create linkages rather than impress the corporate troops with technical bravado.

Linkages and cooperation are particularly important in this age of the emerging virtual corporation. Although these types of organizations barely exist today, facets of virtuality are beginning to surface in many enterprises. In "Quick Change Artists," beginning on Page 32, Contributing Writer David Freedman describes the different manifestations of the virtual corporation. Essentially, a virtual enterprise revolves around serving customers, and this involves sharing information. As one observer put it, 99 percent of transactions that take place among organizations involve information exchange.

The CIO is in a position to create an infrastructure that will assure the transport of information. Some may look at the situation as being in the line of fire; others look at it as an opportunity. The choice is up to you.

Marcia Blumenthal

PHOTO BY WEBB CHAPPELL

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> *"There are three keys to the future for any organization that wants to participate fully in the 21st century. They are anticipation, innovation and excellence. All three are necessary."*
> —*Joel A. Barker*
> Future Edge

Exactly six years ago we published the first issue of *CIO*. It seems like yesterday. When I think back on the launch, I realize that the strategic planning that went into the creation of *CIO* is really no different from the strategic planning that CIOs have to involve themselves in every day.

Visionary projects must be rooted in basic futurist fundamentals, as Joel A. Barker has reiterated in his books and lectures. Whether you're planning a major overhaul of your invoicing systems or launching a magazine, "business as usual" will no longer be tolerated—not by your employees and especially not by your customers. The minute someone else figures out how to do it better, faster and more economically, let's face it—you're eating dust.

And the responsibility to out-think a competitor is falling more and more on the CIO.

As CIOs' responsibilities grew more complex, and as it became clear that they were assuming the roles of enterprisewide strategic thinkers, the need for an information source like *CIO* became apparent to me. Senior management wants to align the IT plan and infrastructure with business strategy. That leaves CIOs with the enormous responsibility of explaining the significance of emerging technologies and demonstrating how previous investments in technology have contributed to the bottom line. For the past six years, it has been *CIO*'s mission to help you justify, manage, expand and, of course, strategically plan technology requirements.

We pledge to continue providing the information to help you deal with current and future IT-management issues. Thanks for all your support these past six years.

P.S. Join David Kearns and conference moderator Jim Wetherbe at the upcoming Perspectives Conference, "The Politics of IT: Reordering the Enterprise," October 17-20, at the Westin Mission Hills in Rancho Mirage, Calif. Call our toll-free registration hot line at 800 366-0246. Hope to see you there.

Coming In CIO

Leading Edge

CIOs are increasingly pressed to show their leadership mettle. Some observers believe that as organizations reengineer—and as line managers develop a greater appreciation for the strategic value of technology—effective leadership skills will separate the successful CIOs from the also-rans. *CIO* examines what it takes to be a leader and talks to a few IS executives who have the right stuff.

It's A Dirty Job, But...

With its product offerings jumping from 10,000 to more than 50,000 in five years, Andersen Corp. had to reengineer its inventory system and develop a point-of-sale system in an effort to streamline the process of preparing price quotes. The success of the project has prompted top management at the window manufacturer to appoint the CIO as head of all reengineering projects.

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Computer-aided simulation is being used in a broad range of companies for a surprising variety of purposes. Organizations that have employed the technology describe how it has allowed them to prevent costly mistakes in business-process reengineering, modify employees' on-the-job attitudes and predict everything from assembly-line bottlenecks to a competitor's next strategic move.

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TRENDLINES

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The hospitality trade is not always hospitable for training. At Holiday Inn Worldwide, for example, a high rate of employee turnover and far-flung operations make building a first-rate staff expensive and logistically difficult. So the Atlanta-based hotel-chain operator has turned to multimedia as a cost-effective way to supplement its classroom training programs.

"We chose multimedia as a kind of insurance policy," explained John Lipscomb, Holiday Inn's manager of research and development for multimedia. "We're not able to be on-site all the time, and one of the benefits we're looking for is consistency of training information for all new hires." Self-paced sessions, lower travel costs and reduced learning time (students learn two to four times faster with multimedia, one study shows) also give multimedia an edge over traditional methods.

The company's multimedia system is being implemented as part of a $60 million initiative to provide the hotels with a customized property-management system and reservation software. The system will run on PS/2 workstations from IBM Corp. that will be installed at the hotels.

Holiday Inn's first multimedia application is a rate- and inventory-management program that was implemented at headquarters several months ago. "We really want employees to find the material challenging so that they get hooked on the system," said Jewell DeWeese, vice president of franchise service and education. The system features user-friendly, interactive CD-ROM technology that is designed to accommodate all levels of computer-literacy.

In the hour-long program, users assume the role of a newly hired hotel general manager, whose task is to raise revenues 15 percent in one year. Guided by "Jack the Bellman," users "walk through" the hotel, visiting various functions and interviewing sales representatives, the executive housekeeper and other assorted employees. They then make

---

Don't Kill the Messager

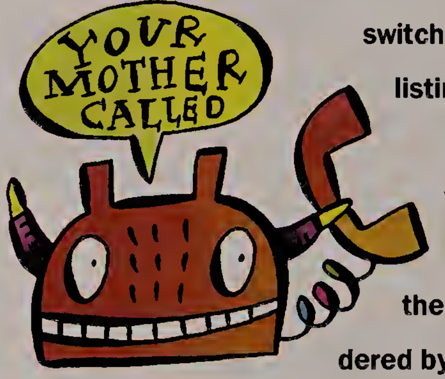
Voice mail is like a beloved child: We'd be miserable if it weren't around, but it frequently makes us tear out our hair. A new booklet from the Voice Messaging Educational Committee (VMEC) purports to be a sort of Dr. Spock for voice-mail users, offering common-sense advice for solving or preventing frequent problems.

"Making the Most of Voice Mail" is a response to a recent survey sponsored by the VMEC, an association of voice-mail equipment manufacturers and service providers. The survey found that although 58 percent of callers would rather leave a message on voice mail than with a third party, many complained about confusing menus, outdated greetings and the inability to reach live assistance. The booklet urges voice-mail subscribers to ease those frustrations by:

- Updating their personal greetings regularly (preferably daily);
- Instructing callers how to reach a live operator; and
- Alerting callers and supplying a colleague's number if they plan to be away for some time.

For callers, the guidebook has these suggestions:

- If the call is urgent, press zero;
- Keep messages to the point; and
- If stuck in "voice-mail jail," press zero or the designated keys; try hanging up and calling back; or call the switchboard if there is a separate listing.



If all else fails, the guide advises, send a letter of complaint along with a copy of the booklet, which can be ordered by calling 201 605-8000. ■

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management decisions based on the information gathered; points are awarded based on how their decisions affect revenues.

Other subjects to be covered by multimedia include business planning and sales and revenue management. According to DeWeese, the multimedia programs will complement training provided by consultants. "It's still important for colleagues to get together and trade war stories," she said. "There is no substitute for networking to build relationships."

CONFERENCE ON BOARD

It's mobile, high-tech and improves productivity. As for speed—how does 70 mph grab you?

The business tool in question is an unpretentious Chrysler stretch minivan that through the ingenuity of Cap Dunton, the owner of the Technology Garage of Malden, Mass., has been transformed into a virtual office on wheels. Dunton and Paul Napoli, his chief mechanic, designed and built their Technology Business Van for budget-minded executives who deplore seeing valuable time wasted in transit. For $55 an hour (plus communications costs), the chauffeured van can make an executive's trips to airports and off-site meetings a productive part of his or her business day.

The mobile conference room is equipped with fax machine, copier, speaker phone, cellular phone, VCR, TV, radio, cassette player and plenty of table space hidden inside the main console. Seating arrangements accommodate meetings and partitions offer occupants maximum privacy.

But nothing, of course, is perfect. Missing from the Technology Business Van are modems, computers (although a cigarette-lighter jack could be used to power a client's laptop, Dunton suggests) and—perhaps the greatest deficiency—coffee-brewing technology. For additional information, call 617 397-7963.

PHOTO COURTESY OF TECHNOLOGY GARAGE

"On the Internet, nobody knows you're a dog."

ILLUSTRATION BY P. STEINER © 1993 NEW YORKER MAGAZINE, INC.

ACRONYMONIOUS BEHAVIOR

Few things divide cultures more than language. Business types, many of whom already view their technology colleagues as a breed apart, are further alienated by the alphabet-soup vocabulary that plagues so many IS shops. Learning to use DOS, CASE and LAN in normal conversation was difficult enough, they complain; how do you communicate with someone who throws around terms like SQL, DDBMS and XNS/ITP?

While the heavy use of acronyms in our high-tech vocabulary deepens the shroud of mystery surrounding IS, we have recently noticed an even more insidious trend: Some organizations are starting to use acronyms within acronyms.

Take PDES, a consortium trying to develop a data model to represent products in EDI transactions. PDES stands for Product Data Exchange Using STEP. STEP stands for Standard for the Exchange of Product Data. Then there's VTI—a designer and manufacturer of customized computer chips. VTI stands for VLSI Technology Inc. VLSI stands for very large-scale integration—when a very large number of electronic transistors and other components are built onto a single chip.

Whether or not other industries are also guilty, the technology world cannot hope to defend itself against charges of obfuscation while it indulges in this convoluted practice. Should companies continue to use words whose letters stand for words whose letters stand for something else? Let's not stand for it!

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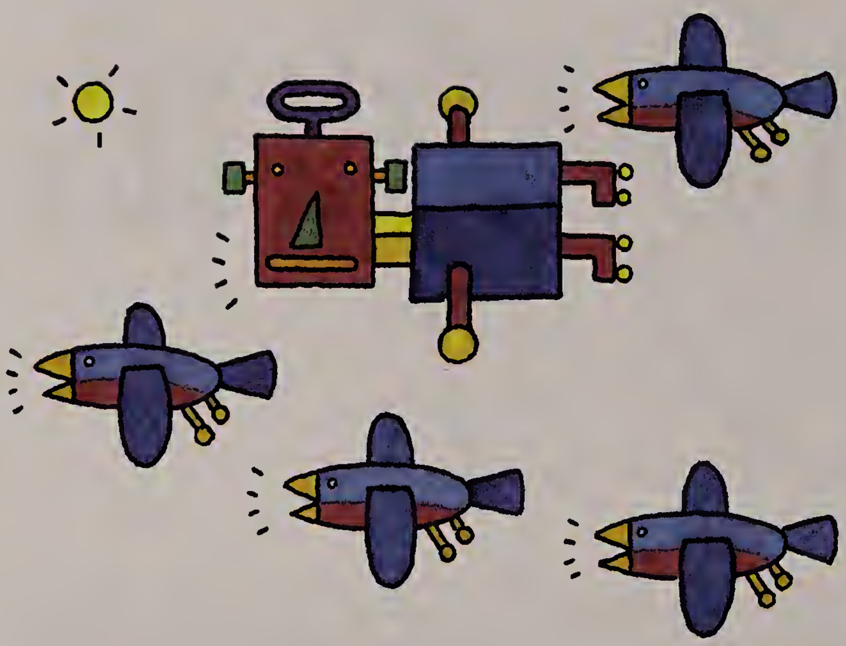

ILLUSTRATION BY JAMES KACZMAN

Birds Do It, Bees Do It

What can birds, bees and army ants teach a robot? How about how to communicate? While these animals exchange messages to accomplish a task, robots working in a group function with blinders on, oblivious to their fellows.

In a study sponsored by the National Science Foundation at the Georgia Institute of Technology in Atlanta, researchers plan to use cooperative animals as models to get lab robots to work together on simple tasks. The goal is to improve the reliability and efficiency of robotic work in environments that are not predictable or mappable, such as a mining operation. Computer simulations have shown that cooperative robots can accomplish search-and-retrieval tasks 20 to 30 percent faster than uncommunicative machines.

In this case, communication is defined as the awareness of other robots' movements and locations. When a wandering robot perceives that another has found a target object, it will home in on its successful fellow in hope that there will be other targets in that area. This speeds retrieval and discourages robots from wandering aimlessly beyond the concentration of targets.

The researchers will equip their three Denning robots with lights to make them recognizable to one another and allow them to calculate position and direction. From these tests, Ron Arkin, project leader and professor of computer science, hopes to identify a formula for optimizing robot interaction for a given task. Once they're communicating, let's hope the robots resist the temptation to build nests in our rafters or march across the jungle stripping away foliage. ▬

NATIONAL I.T. CENTER

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Maryland may be for crabs, but it's also for information professionals. Home to nearly 150,000 IT jobs, 61 federal laboratories and a host of high-profile R&D facilities, it is a natural site for the recently opened National Information Technology Center (NITC), a nonprofit organization designed to facilitate the development and application of innovative, cost-effective information technologies.

Through usability testing, licensing assistance, product demonstrations and other services, the Center, located in Rockville, aims to help organizations clear a path through the increasingly tangled undergrowth of technological change. "We want to help our members avoid becoming road kill on the information highway," explained Michael Walter, the Center's CEO.

Say a CIO is considering a product that looks great in the showroom but might not survive 10 minutes on the highway with an actual user. The NITC can help guide such investment decisions by providing a vendor-neutral laboratory where trained staff members test and evaluate the usability of IT products and prototypes. Testers in the laboratory's "user

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Ouellette & Associates Consulting Inc. invites IS executives to participate in the 1993 Developing the Human Side of Technology Award.

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The winning submission will be selected by a panel of judges that includes Ouellette executives and editors from leading industry publications. The award recipient will be announced November 12.

To submit a nomination, send papers describing your corporation's outstanding achievement(s) by October 18 to Ouellette & Associates Consulting Inc., Developing the Human Side of Technology Award, 40 South River Road, Suite 66, Bedford, N.H. 03110, or fax it to 603 623-4052. For more information, call 603 623-7373. ▬

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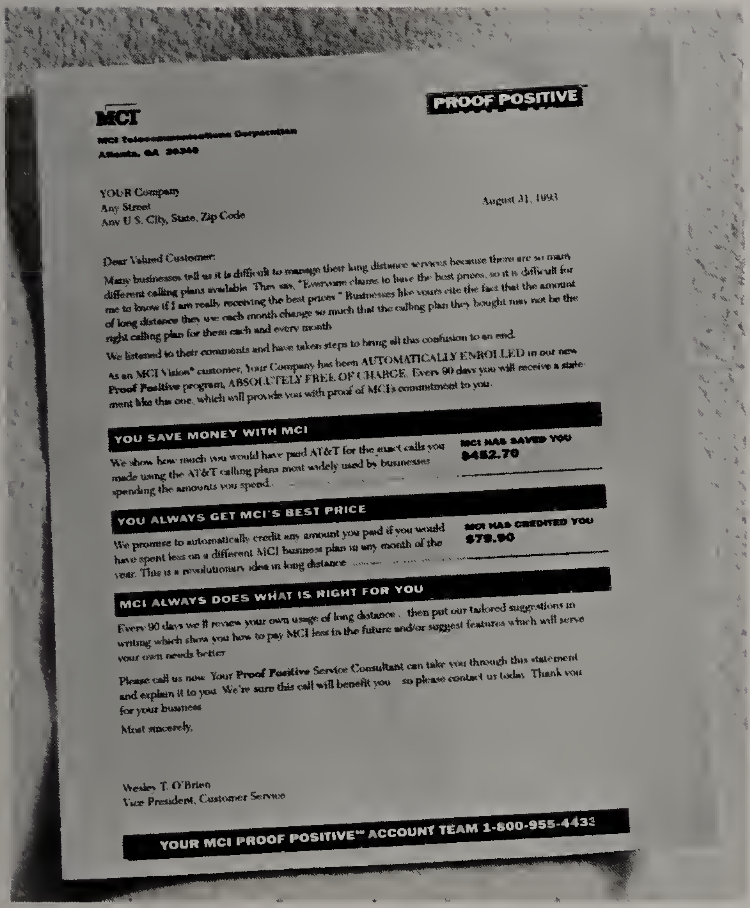

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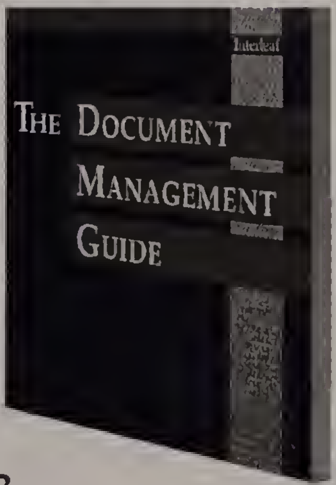

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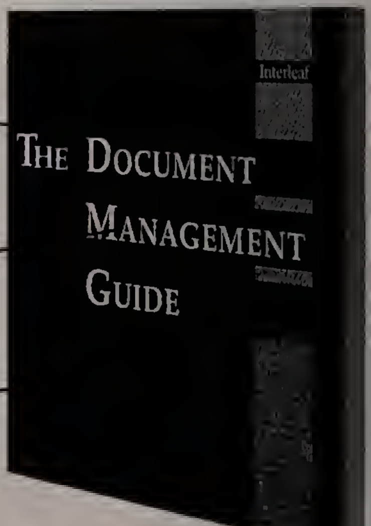

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room" are monitored from behind a one-way window. Their interactions with the product are videotaped, and they are interviewed after the test to provide subjective as well as objective data.

The process also pays off for vendor companies, which can learn whether their products are likely to be marketed successfully and catch bugs before they become costly to fix. The NITC also expects to test off-the-shelf products and provide users with detailed, quantitative reports.

The consortium offers other services as well. A brokerage function assesses user companies' needs, inventories proprietary technologies that members wish to market, and uses both sets of data to create sales, purchase and transfer opportunities among members.

In addition, the Center provides education and training programs, a market-information service that retrieves hard-to-get facts on emerging technologies, technology demonstrations in a multivendor environment and collaborative opportunities for members wishing to pool resources in pursuit of new markets.

Annual membership fees start at $500 for commercial users and $1,500 for technology companies.

For additional information, call 800 938-NITC. ■

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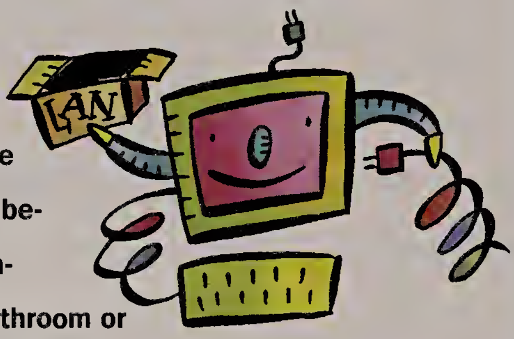

Want to be productive in the five minutes before your next meeting? Instead of running to the bathroom or making that fresh pot of coffee, how about installing a LAN?

In a further step toward demystifying technology, Coactive Computing Corp. of Belmont, Calif., has created a tool that makes networking as easy as assembling a child's bike. Coactive Connector is a family of do-it-yourself networking products designed to be purchased, installed and maintained by nontechnical computer users.

The product enables users to share information and peripherals among any combination of up to 32 PCs, including DOS, Windows and Macintosh machines. The company says its hardware and software can be installed by first-time network users in less than five minutes. There is no need to open the computer; the PC connector simply attaches to its parallel port.

The price for DOS and Windows versions is $149. Coactive Connector for Macintosh, which includes simpler hardware and no system software, costs $29. More information is available by calling 415 802-1080. ■

ILLUSTRATION BY MARY ANNE LLOYD

OFF THE SHELF

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GARY DESSLER

WINNING COMMITMENT

HOW TO BUILD AND KEEP A COMPETITIVE WORKFORCE

By Gary Dessler
McGraw-Hill Inc. (New York), 1993
226 pages, $22.95

It's a refrain we've heard time and again: The future belongs to those corporations that can best manage change. Unfortunately, the key ingredient for managing change successfully—committed employees who identify with and adopt the goals of the firm—is hard to come by. The fact is, it's tough to feel committed to an employer when the sword of Damocles—in the form of a pink skip—is hanging over your head.

In *Winning Commitment*, Gary Dessler profiles 10 organizations bucking the trend of uncommitted employees and reaping the benefits of a dedicated, motivated workforce. Citing examples such as Ben & Jerry's, Federal Express, IBM and Saturn Corp., Dessler identifies eight "keys to commitment," including people-first values and value-based hiring. Granted, some of Dessler's keys may sound soft, but there is a hard business reason behind each.

While the term doubletalk normally refers to duplicitous or ambiguous speech, Dessler defines it as two-way communication between employees and management. All too often, he writes, employees have no way to make themselves heard. But at high-commitment firms, "managers know that communication is built on trust, and that trust requires a flood of two-way communication." IBM's Speak Up program, for example, enables employees to ask questions or make comments and receive a reply while withholding their identities from all but the program administrator.

"We've seen that the time to start building commitment is before—not after—employees are hired," Dessler writes. He argues that value-based hiring, although time-consuming, ultimately produces a more-congenial, dedicated staff by evaluating applicants' personal qualities and values as well as their job-related skills.

At Saturn, for example, applicants are prescreened and subjected to a three-and-a-half-hour written test. Candidates who make the cut participate in a two-and-a-half-hour group exercise and then meet Saturn "work teams," who conduct standardized interviews and make the final hiring decisions.

Winning Commitment offers a useful blueprint for creating a workforce that treats the company as its own. ■

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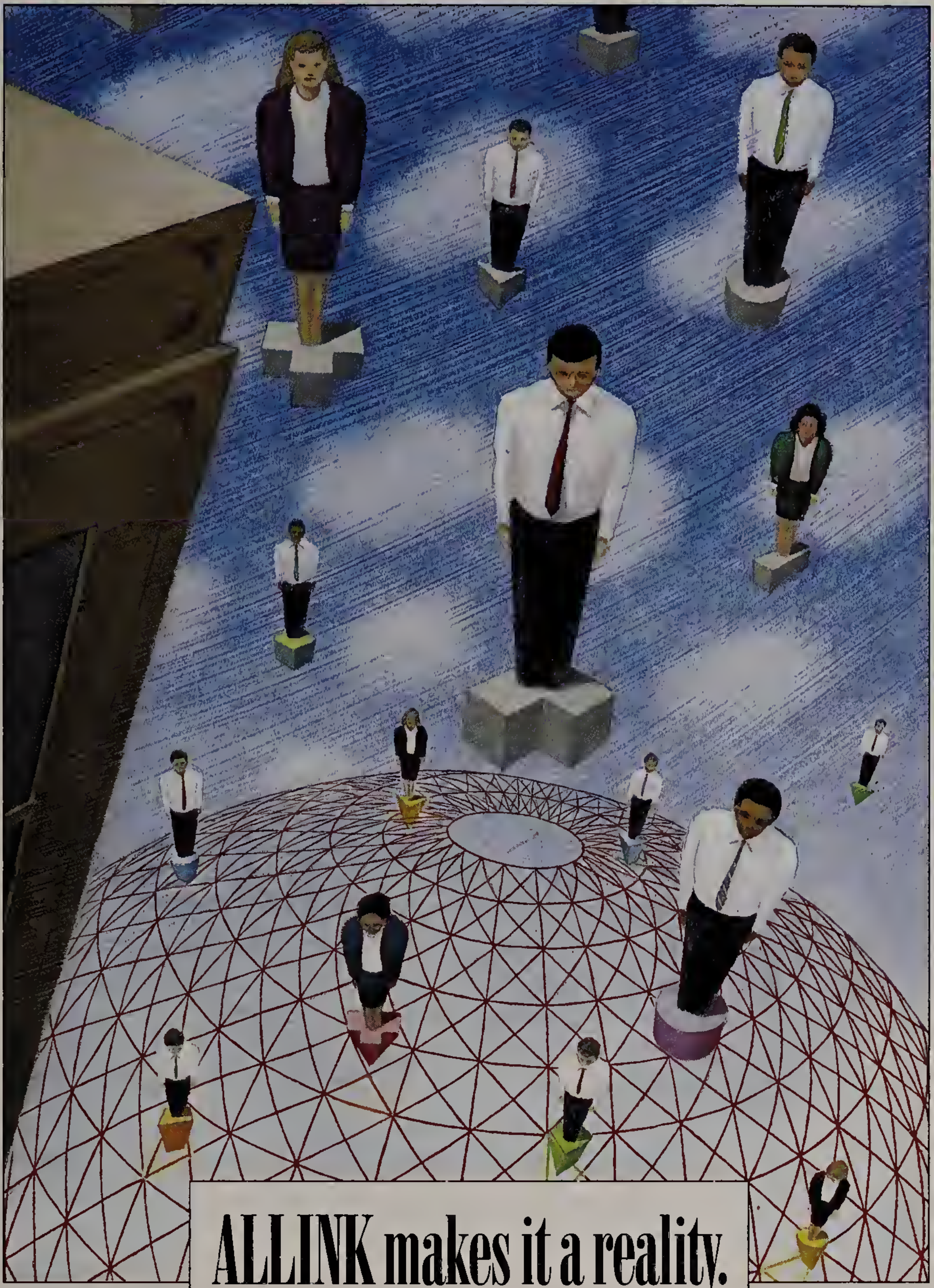

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IT Advance Teams

Advanced-technology groups provide insight into the use of new technologies for their organizations' future success. To be effective, they must orient themselves toward IT's practical application within a business framework.

BY THORNTON MAY

The year 1993 is establishing itself as the year that organizations must get off the fence and put unambiguous stakes in the ground regarding the technologies they will use to compete in the future. The budgets are there. The strategic intent is there. The question in many boardrooms today is, are organizations technologically smart enough to make the right choices?

Shrink-wrapped knowledge—the stuff obtained from the many information-age comic books (PC magazines)—is insufficient to make the million-dollar technology bets now on the table for most companies. Organizations must know where their "technological smarts" reside. Advanced-technology groups (ATGs) can play a central role in creating and distributing the knowledge necessary to make money in a technology-rich but certainty-poor world.

ATGs are charged with promoting the acceptance and use of new information technologies with the potential of providing competitive advantage. In a recent study conducted by Tenex Consulting of more than 100 large organizations, ATG spending ranged from .46 percent to 2 percent of total IT spending. Staffing ranged from .25 percent to 1.5 percent of total IT head count.

ATGs provide a variety of services to business-unit customers, both before and after technology purchases are made. Their most critical task is to share and distribute business-relevant technical knowledge, convert that knowledge into value-creating programs and activities, and position the ATG within the organization.

A number of trends were identified in the study. The word "advanced" is being dropped from group titles in favor of the more-practical label "applied." Corporate ATG budgets are getting smaller, with business units becoming the arbiters of value and the primary source of funding. "Slush funds" wielded solely at the discretion of the ATG are drying up. Fee-for-service, project-driven funding arrangements are replacing historically dominant overhead allocation programs. And ATGs are employing fewer people.

These groups assume a variety of forms. But how the ATG is structured is not as important as how it creates and distributes business-relevant technical knowledge.

The centralized ATG model is a throwback to medieval times (the pre-information age), when the ruling princes wanted to keep a close eye on the activities of their wizards. Bureaucracies depended upon the rationalization and centralization of knowledge as the basis of control, and there was a distinct separation between those that did and those that thought. This has given way to a world where everybody thinks. The knowledge necessary to make money with technology is no longer the sole purview of centralized experts

ILLUSTRATION BY VALA KONDO

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Many ATGs have become playgrounds for sedentary, maladjusted scientist wannabes. Like silicon-addicted squirrels, they hoard their technology nuts. But the nuts must be shared. The focus of the group must not be technology alone but technology in a broader business context.

but rather exists in pockets throughout the organization.

The Tenex study shows that successful ATGs (those with growing budgets and a rich portfolio of development activities) are not parsimonious in their distribution of intellectual assets. They are perceived not as sources of permission but rather as idea merchants and stimulants heavily involved in an external network of what is new.

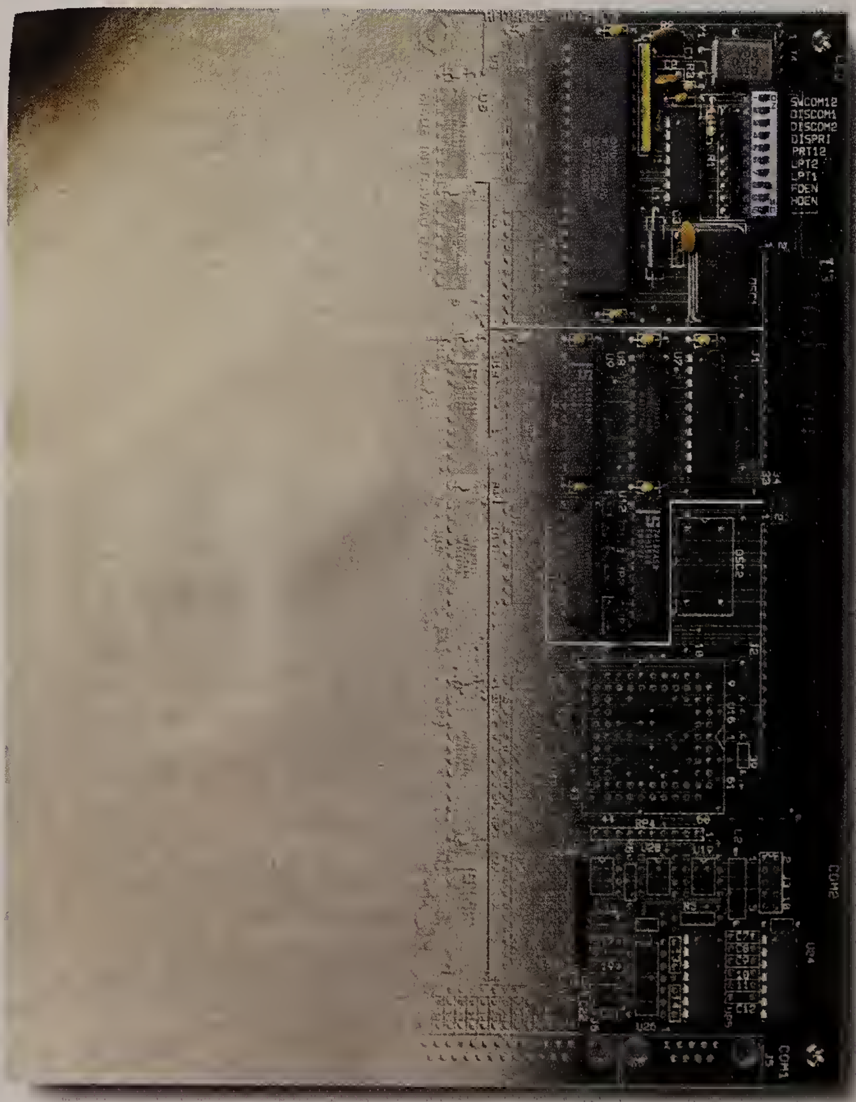
Successful groups are less like dictators, more like talk-show hosts. Soviet-style, five-year technology blueprints have given way to technology "sketches" regarding what works and what doesn't. In a world of continuous change, the nature of knowledge and planning has changed radically. Still, centralized structures persist in large organizations.

A fundamental challenge facing ATGs is to resolve the disconnect between the technologies they play with and the process of making money. While most technology groups have swung for the fences regarding the technology sets in which they want to develop expertise, they appear to have bunted regarding how those sets might actually make the organization money.

The less-than-dramatic revenue pull associated with technology-group activities has prompted senior management groups to ask the questions, "Do we have too many technologies? Do we have too many technologists?" Technology Groups that don't want to be relegated to the ash heap of history must abandon their mental shutters regarding how money happens.

A sluggish global economy in the early '90s gave birth to a siege mentality in many boardrooms, where senior management appeared more intent on looking for cover than pursuing shareholder value. Many ATG budgets were significantly reduced, in some cases not inappropriately.

For many ATGs, a fundamental repositioning is necessary. What group management must do is not so much reinvent the mission and purpose of the advanced-technology function as to relegitimize its goals of assembling and successfully applying practical knowledge. Here's what an ATG should do:



- ■ Build something that makes the company money. Provide a handful of visible emerging technologies that put money in corporate coffers. ROI doesn't only mean return on investment; it also means return of innovation. There is more money to be made creating value and growth than in destroying costs. In the imaging world, insightful ATGs discovered that the cost-reduction mind-set was too limiting. True power lay in creating images that people would pay for, not in destroying paper records.
- ■ Proactively manage perceptions. Undertake an attention-engineering program (subtle advertising designed to give the skeptics a reason to watch). Serve as a "persuader-in-chief."
- ■ Get outside the box. Many ATGs have become playgrounds for sedentary, maladjusted scientist wannabes. Like silicon-addicted squirrels, they hoard their technology nuts. But those nuts have to be shared. The focus of the group must not be technology alone but technology set in a broader business context. Successful technology groups spend 85 percent of their time away from their desks—35 percent outside the organization checking out new technologies, 50 percent working with business units applying them.

An important clarification is necessary. In our study, we encountered one subspecies of advanced technologist who spends virtually all of his or her time outside the organization flitting from one trade show to another. The problem is that the technologist never spends any time figuring out how to make money with all this new stuff. Dilettantes impressed with their aggregation of frequent-flier miles are an endangered subspecies. Trade-show operators are finding it increasingly difficult to "pack the tent."

- ■ Do not operate without metrics. Establish the terms under which the ATG will be judged. Create the rules and let somebody else keep score. Build scenarios that serve as the foundation for long-range budget planning and determining the number and kind of troops and weapons the group should maintain.

The ATG of tomorrow will feature technologically knowledgeable senior professionals who can certify for senior managers (defined as individuals who sign big checks) that the technology they buy will not only work, but will work at scale and generate a profit.

Organizations need to re-articulate the business value added by ATGs. Management, when confronted with a business unit that neither knows nor communicates value, rightly concludes that the costs associated with its activities are too high. ATG managers must quantify and communicate the value they deliver.

Thornton May is director of research for Tenex Consulting in Burlington, Mass.

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Object Lessons

They've been there. They've done it. Now 14 object-technology trailblazers are ready to share the lessons of their experience

BY NANCY DEYO AND JOE GILLACH

Taligent, founded by Apple and IBM to bring to market a next-generation operating environment, set out to capture the experiences of early adopters of object technology to provide a map for other companies just embarking on the object journey. Taligent examined 14 companies in the United States and Europe, collectively representing some of the most extensive object-development experience in the world. These companies have built more than 60 mission-critical applications using standard object-oriented languages and frameworks, and made significant commitments to further object-oriented development.

Companies unanimously stated that organizational discipline and careful management of object technology's impact are key to success. “It wasn't the tools, the language or the methodology that accounted for our success,” explained one IS executive. Rather, it was “the way we introduced it to our development team, our revamped team structures and new incentives...that soft stuff.”

ILLUSTRATION BY KEVIN HAWKES

Without efficient software-development practices and careful analysis and design discipline, object technology just won't work. Unfortunately, the effects of habit, familiarity and tradition too often diminish productivity. Several of the companies studied welcomed object technology as an opportunity for sweeping change. One CIO described it as “a Trojan horse that lets you make organizational and cultural changes and impose discipline under the guise of adopting a new development approach.”

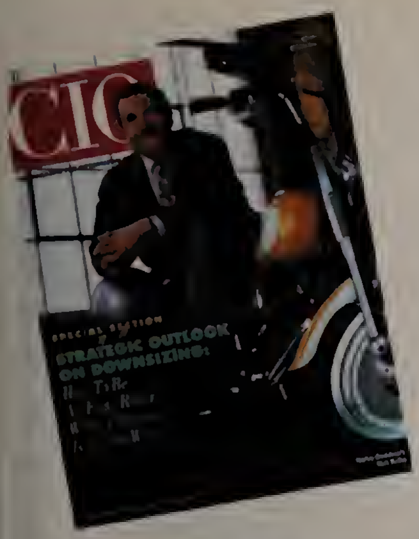
The companies identified eight organizational and management practices critical to success:

Educate management. Many companies struggled to find the best way to solidify management support before launching object-oriented projects. One manager commented, “My executives are used to grasping new technology well enough to make decisions after a half-day seminar, but you can't comprehend object technology that quickly.”

Courses for senior managers are an excellent way to gain support. At one company, a consultant taught a five-day course in object concepts to prepare executives for making informed investment decisions. Most important is focusing on business benefits rather than technical details. “Want to see a roomful of glassy-eyed executives? Start lecturing them on polymorphism, subclassing and inheritance,” warned one evangelist.

Find influential sponsors. High-level sponsors are key to securing the resources and management patience to see an object project through. Don't confine your search to IS; in several cases, the champions of object projects were visionary business executives.

Set appropriate expectations. Setting realistic expectations for users and executives is critical, particularly for the first project. Sell the short-term benefits of flexible systems and



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rapid application development, and emphasize that significant code reuse and reduced maintenance will come in the longer term.

Choose applications carefully. First, look for complex, highly interactive applications. As one manager observed, "If the application is too simple, you aren't taking advantage of the technology's ability to handle complexity." In other words, leverage objects for solutions too complex for procedural development.

Second, identify application "families" or groups sharing common functionality in order to achieve reuse. Participants not only identified closely related applications, but from the beginning developed sets of common objects for use across multiple, related applications—exponentially increasing developer productivity.

Find motivated developers. Allow skilled and motivated developers to select themselves by posting opportunities when assembling object teams. Curiosity and the motivation to learn are better predictors than programming background of the ability to master object technology. As one executive put it, object developers "are like pigs; you don't have to convince them to have breakfast. They'll run over you on the way to the trough." Their antitheses are like "chickens, [who] peck around and never commit to anything."

Invest in training. Training for object technology is likely to require twice the investment of resources for conventional programming. Total immersion was often helpful.

Most organizations identified three learning curves, requiring different levels of training:

- Fully grasping the object paradigm—including concepts, analysis and design—is the most difficult task to learn and should come first.
- Object-development environments, including libraries and frameworks, are usually a moderate challenge. They should be introduced after developers are thoroughly steeped in the paradigm.
- Object-oriented languages are less problematic, especially for experienced developers.

In sum, object training consists of more than simply teaching a language, and it should begin with a thorough grounding in object concepts. The typical learning curve is three to six months; true object proficiency typically requires about a year, or one full project. White papers, mentoring programs and technology forums can reinforce training and elevate internal awareness of object benefits.

> **"If the application is too simple, you aren't taking advantage of the technology's ability to handle complexity."**

Every company in the study emphasized the importance of outside trainers and consultants, especially at first. But they stress that it is important to begin knowledge transfer from day one, to avoid being "held hostage" by such experts.

Define new roles. Object-oriented projects require new organizational roles, skills and management styles. Critical roles include:

- Evangelists, to act as mentors, champions and educators;
- Object analysts and designers, to bring modeling discipline and methodology to projects;
- Object librarians, to manage class libraries and promote reuse of common objects across projects;
- Object "consciences," to ensure a rigorously applied object-oriented approach;
- Object assemblers, to assemble prebuilt objects from corporate and third-party class libraries into applications; and
- Domain specialists, with knowledge of critical business processes.

Finally, as object applications more closely model real-world business structures, and iterative development is practiced more widely, the end user becomes a more-critical member of the development team.

Develop structures and incentives to promote reuse. Reuse is not an automatic byproduct of object development. In hindsight, companies learned that reuse is driven by good management and organizational practices as much as by technology.

- Reuse requires easy programmer access to object resources. Establish object warehouses and libraries—electronic and hard copy—for design and analysis documents as well as reusable objects. And do it early.
- Warehouses and libraries need object librarians to maintain common objects and promote reuse. The librarian evaluates objects, assesses whether they are well-tested, documented and reusable, and assigns each a name that communicates its purpose. The librarian also acts as a consultant to those beginning projects on which objects are available for reuse.
- Productivity metrics and incentives should reflect the object-development process. For example, measure performance on objects reused and rapid-application assembly, rather than on lines of code produced. "Motivate them to build solutions, not code that has to be maintained," said one CIO.
- Remember that object project cycles differ from procedural cycles, typically requiring longer analysis and design phases and shorter coding phases. Holding development teams to old-style schedules will short-circuit the up-front analysis and design essential to reuse.

Did these companies benefit from blazing the trail? Absolutely. Virtually every organization said the primary short-term benefits were more-flexible, adaptable systems and applications that are more responsive to changing business requirements. In the longer term, an increasing rate of reuse and lower maintenance costs appeared typically after the second or third project.

The critical end-user benefit of object is that applications better reflect business needs and are more-easily customized. Users also report better communication with developers during iterative development.

Is it worth the trouble and investment? Stated one CIO, "Object technology offers an ideal product and service-creation environment that can, for the first time, keep pace with an ever-changing business."

Nancy Deyo and Joe Gillach are responsible for market development and corporate-developer relationships at Taligent Inc.

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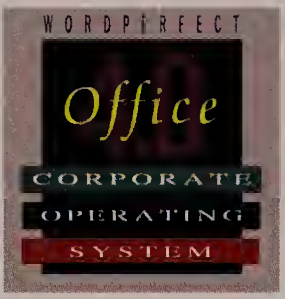

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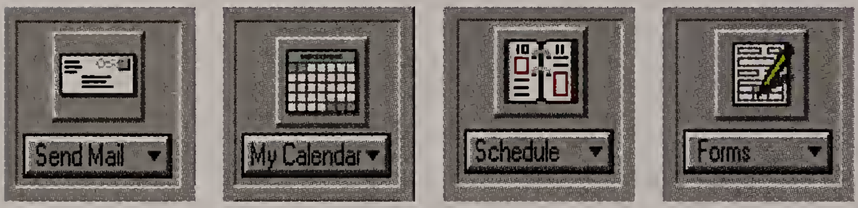

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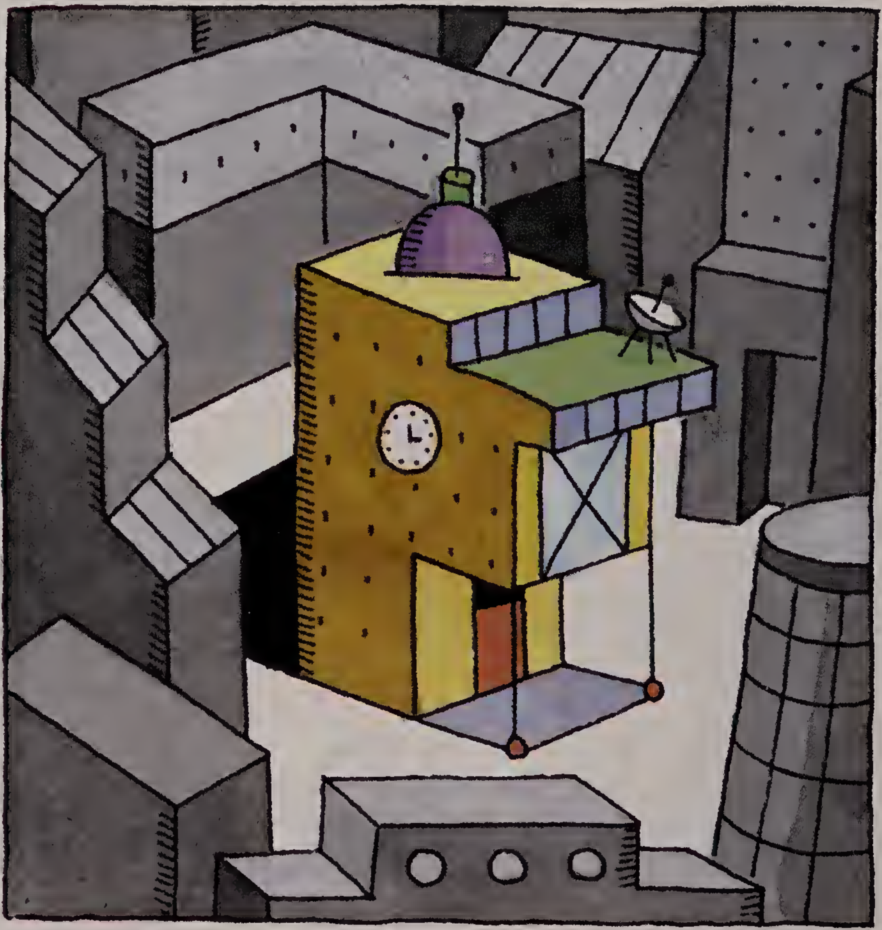
QUICK CHANGE ARTISTS

They're fast, they're flexible and they're the future. Virtual companies are breaking down organizational barriers and building up customer expectations—and none of it would be possible without IT.

BY DAVID H. FREEDMAN



No wonder much of the business community is confused by the idea of the "virtual company"; the phrase has been bandied about by so many people in so many different contexts that is has become something of a virtual concept. Is a virtual company one that quickly produces new, highly customized products? Is it one that reshapes itself and redirects its resources in response to sudden changes in its markets? Is it composed of alliances of different companies and business units? Should anyone care?

Actually, they probably should. To effectively deal with today's changing marketplace, companies have to evolve from the form in which they've been stuck for a century. There is no consensus as to what will be the result of this evolutionary process, but "virtual company" is as good a name as any to describe the new corporate entity. And many observers agree that the attributes assigned to so-called virtual companies will be among the most important characteristics of future successful corporations. So why argue whether a virtual company is flexible, real-time or multiorganizational? It will probably have to be *all* of these things.

Take this simple test: Describe exactly how your company is organized, the details of its work processes, and the precise nature of its products and services. Then, see if your description holds true three months from now. If it does, you're not working for a virtual company.

And that could turn out to be a problem.

Fortunately, if you're an information executive, you're probably in a good position to help solve that problem. That's because the transition to a virtual company will not be possible without IT. For all the talk over the past decade about the impact that IT is supposed to have on the business world, this may be the first time organizations actually define themselves around their IT capabilities. It could be the CIO's best opportunity—or worst nightmare. You thought seamlessly integrating

your company's systems was tough? Get ready for a world in which you may have to smoothly blend your manufacturing, engineering, financial, order-entry, customer-information and other systems into those of a dozen different companies one week, and a dozen new ones the next.

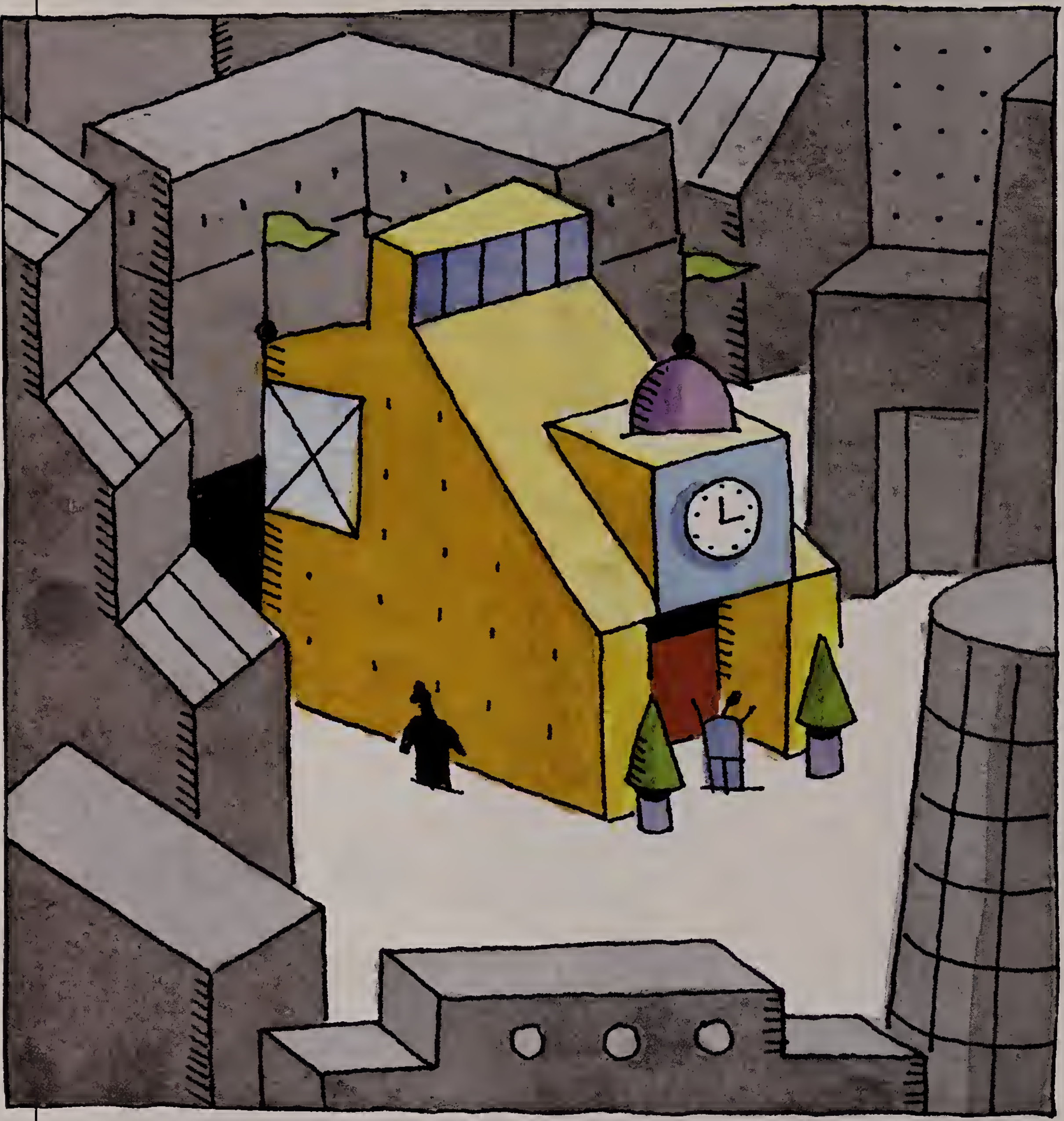
The move to virtual companies is essentially customer-driven. The mass-market world is dying; today's markets are fractured by factors including age, income, lifestyle and ethnicity. (See "How to Be a Great Client Server," *CIO*, August 1993.) Each set of customers demands high-quality, perfectly customized goods and services. At the same time, because their demands change more rapidly than previous customer sets, they offer companies a relatively tiny window of opportunity in which to meet those demands.

Meanwhile, the tradition dies hard of praising corporations for being paragons of stability, churning out millions or even billions of identical items for years at a time. "There's a great deal of organizational viscosity out there, and it's going to be hard to overcome it," said Dr. Charles M. Savage, mentor and manager of the Organizational Effectiveness Practice at Digital Equipment Corp.'s consulting-services group in Marlboro, Mass.

The way to make companies more fluid is to break down hierarchies

ILLUSTRATIONS BY ROBIN JAREAUX

and open up horizontal channels of cooperation among managers, departments, divisions—and especially customers, suppliers and competitors, said Savage. Ironically, he noted, these changes would represent a sort of throwback: Up until the advent of large utilities and the steel and automobile industries at the end of the 19th century, businesses routinely fell into loose alliances to manufacture complex products. Going back, however, won't be easy. "We've lost the mind-set for cooperation," said Savage. "Our culture teaches us to seek out each other's weaknesses when what we need to do is leverage each other's strengths."



Dan Appleton, president of D. Appleton Co. Inc., a management consulting firm in Manhattan Beach, Calif., also believes that U.S. companies aren't geared for working together—especially in comparison with Japanese companies. Over a period of decades, he noted, Japanese firms such as Toyota Motor Sales USA Inc. have become masters at organizing confederations of suppliers that are intimately bound by a common goal: producing a high-quality product that satisfies the customer's needs. And when American businesses do ally themselves—as has occurred in the aerospace industry, where companies are heavily dependent on subcontractors—they tend to rely on financial penalties and lawsuits to iron out wrinkles. The situation can be almost as bad *within* companies. "Sometimes divisions cooperate," said Appleton, "but a lot of the time they don't."

Implementing a means for close information-sharing within and between organizations will be critical to overcoming these barriers, asserted Appleton. "If you look at all the transactions that take place between companies or divisions, 99.9 percent of them are informational. It will be up to IT to create the transaction infrastructure that partnerships will be built around." And that means a lot more than EDI, he added.

Product design and engineering is one area where companies are starting to go virtual. Ross Operating Valve Co., for example, typifies a new breed of manufacturer that specializes in rapid product-prototyping. The Troy, Mich.-based company, which produces prototypes and valves, connects its computer-aided design (CAD) workstations to those of its automotive-industry customers, allowing online, interactive design. "A lot of companies exchange CAD data," said Robert W. Hall, an Indiana University professor on leave to the Association of Manufacturing Excellence in Wheeling, Ill. "But when you're hanging on the same network as your customers, you have the kind of fast exchange that gives you a real advantage." This type of online concurrent engineering, he added, could help break down barriers between a company and its suppliers, customers and even competitors, and go beyond prototyping to manufacturing end products.

In fact, that's already happening in a few cases. One Japanese manufacturer of prefabricated houses allows customers to sit down in a real-estate agent's office and draw customized architectural plans on a computer tied into the factory; the house is then built at the factory in three days and is ready for occupancy in a few weeks, including site preparation. A similar concept drives Textile/Clothing Technology Corp., known as (TC)^2, a nonprofit organization based in Cary, N.C., that was created to increase the competitiveness of the U.S. textile and apparel industries. The organization (which includes E.I. du Pont de Nemours, Levi Strauss and Milliken among its 98 members) is working on a system that—when up and running in a few years—will enable consumers to walk into a retail outlet and design their own suits by customizing one of a number of patterns. They will do this by, in effect, "dressing up" a computer-based 3-D image of themselves. The resulting data will then drive automated fabric cutters and sewing machines at an experimental factory. (TC)^2's sponsors hope to be able to deliver high-quality suits for $200 three days after the "fitting."

> "If you look at all the transactions that take place between companies or divisions, 99.9 percent of them are informational. It will be up to IT to create the transaction infrastructure that partnerships will be built around."
>
> *–Dan Appleton*

Perhaps the most ambitious corporate-information-sharing venture underway is ValleyNet, a joint project of Digital and the Los Angeles-based publisher Times-Mirror Co. ValleyNet, which has recently come online, links the engineering and design systems of a number of companies with operations in the Phoenix area, including Motorola Inc., McDonnell-Douglas Helicopter Co., Allied-Signal Aerospace Co., Honeywell Inc. and Hughes Missile Systems. These companies routinely subcontract to one another, and ValleyNet enables them to jointly design online such products as turbine engines and helicopter transmissions. In addition, they can share administrative and ordering information.

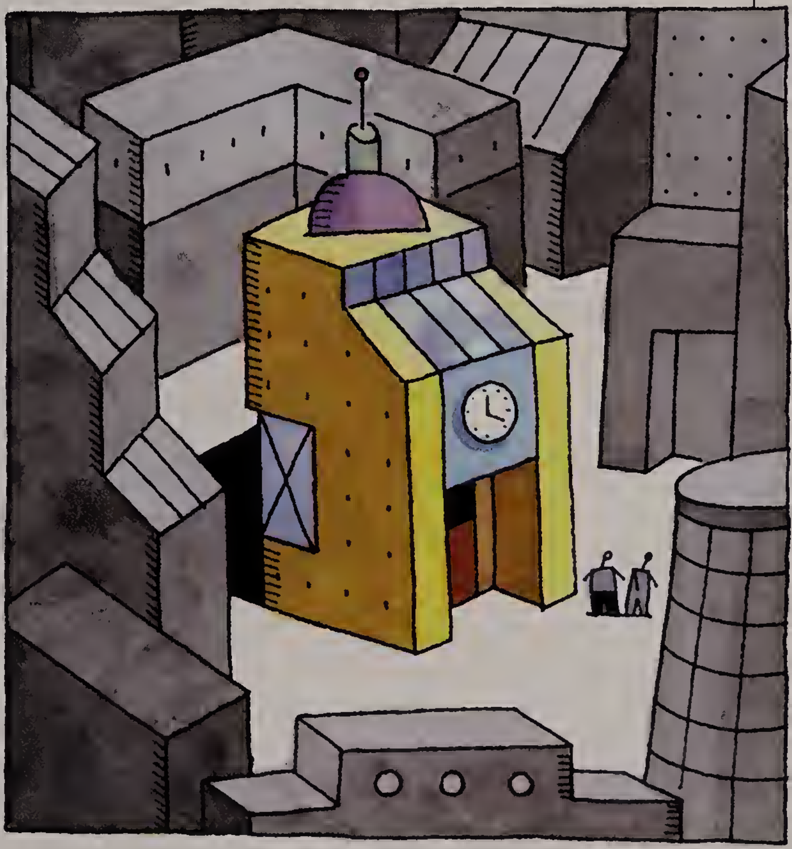
"If two companies can look at the same virtual image of a product and reduce purchase-order and development time by a factor of two, five or even 10, then that should be worth something," said Dan L. Shunk, a ValleyNet manager and director of the computer-integrated manufacturing (CIM) systems research center at Arizona State University in Tempe. If ValleyNet is successful, he added, it may offer similar services to other groups of companies.

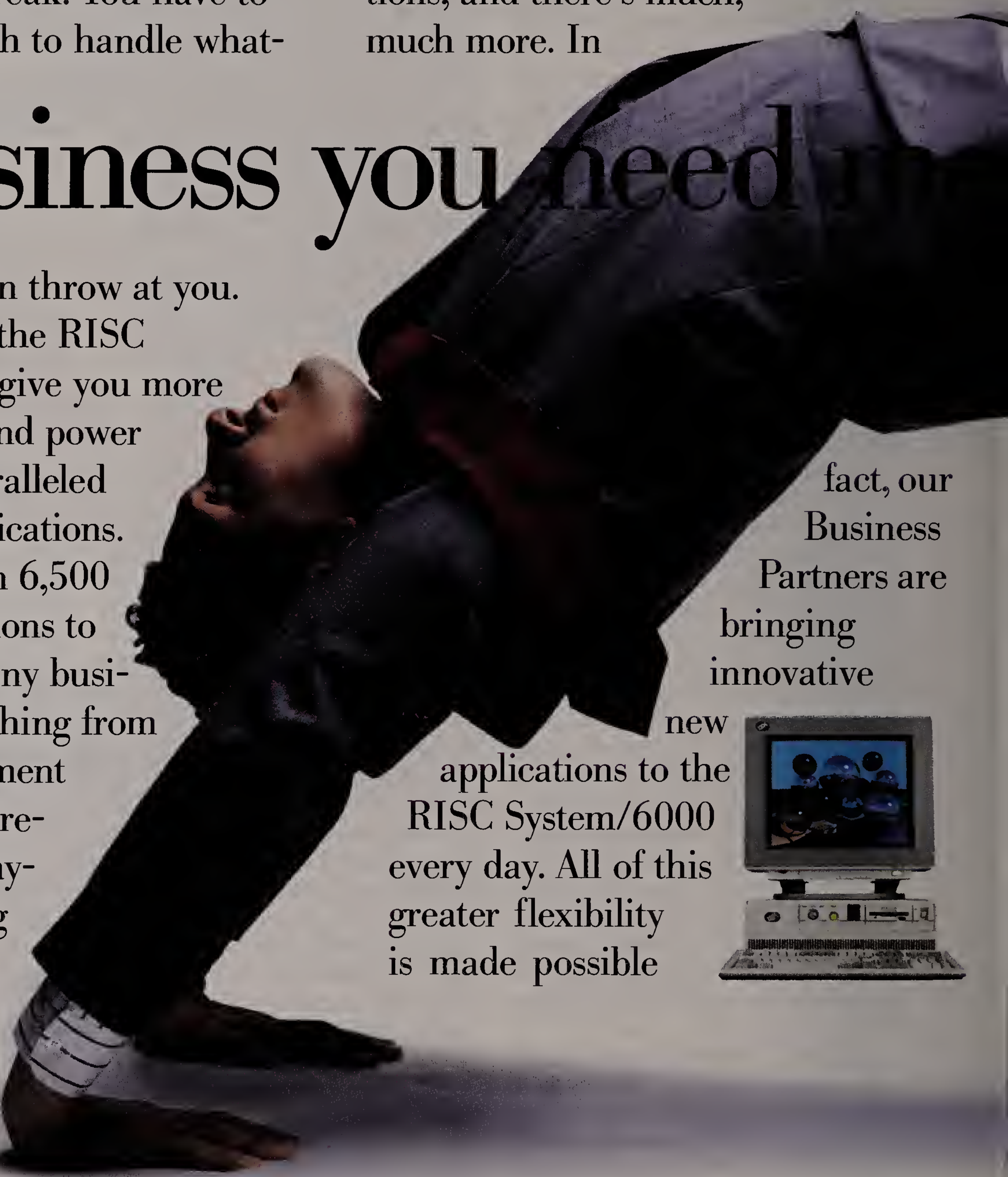
But even projects as ambitious as ValleyNet may only be scratching the surface of what companies must do with IT in order to become virtual corporations. Since the ultimate goal of the virtual company is to serve customers, said Hall, companies will have to share customer databases; since they will have to create joint business plans, they will need to link planning and financial systems. Eventually, he said, all lines between partnering companies' stores of information will blur, raising thorny legal problems beyond the formidable technical ones. "We just don't know how to organize businesses this way," he said. "If a customer creates a design online with a company and the company's supplier, who owns the data? Who does the intellectual capital belong to? The virtual corporation is going to start eroding the legal basis of the corporation."

The complexities of the virtual company may even lead to the obsolescence of the CIO, said Hall. If interchanging data becomes that pervasive and critical, the job may have to be broken up and absorbed by the various business areas. "You wouldn't need a chief information officer any more than companies today need a chief writing officer," he said. "Instead of managing information systems, you'd be managing business functions."

In the shorter term, CIOs face serious challenges in setting up the necessary infrastructure. In particular, said Appleton, IS departments must balance conflicting needs when establishing databases, application software and communications platforms. A divisional IS head in a large company, for example, will want to set up platforms that allow integration with customers', suppliers' and other partners' systems, while corporate IS might pressure the division to accept corporate standards. "The need to service the customer should always take priority over other considerations," said Appleton. "But corporate managers are often more concerned with maximizing efficiencies."

Even companies that don't face conflicting internal demands are likely to encounter conflicting external demands: An organization may have several large customers, suppliers and partners with which it hopes to link, and all of their concerns must be taken into account as well. ValleyNet is already facing this problem. "You know how difficult it is to get a company to switch to a different set of systems?" asked Shunk. "Now multiply that difficulty





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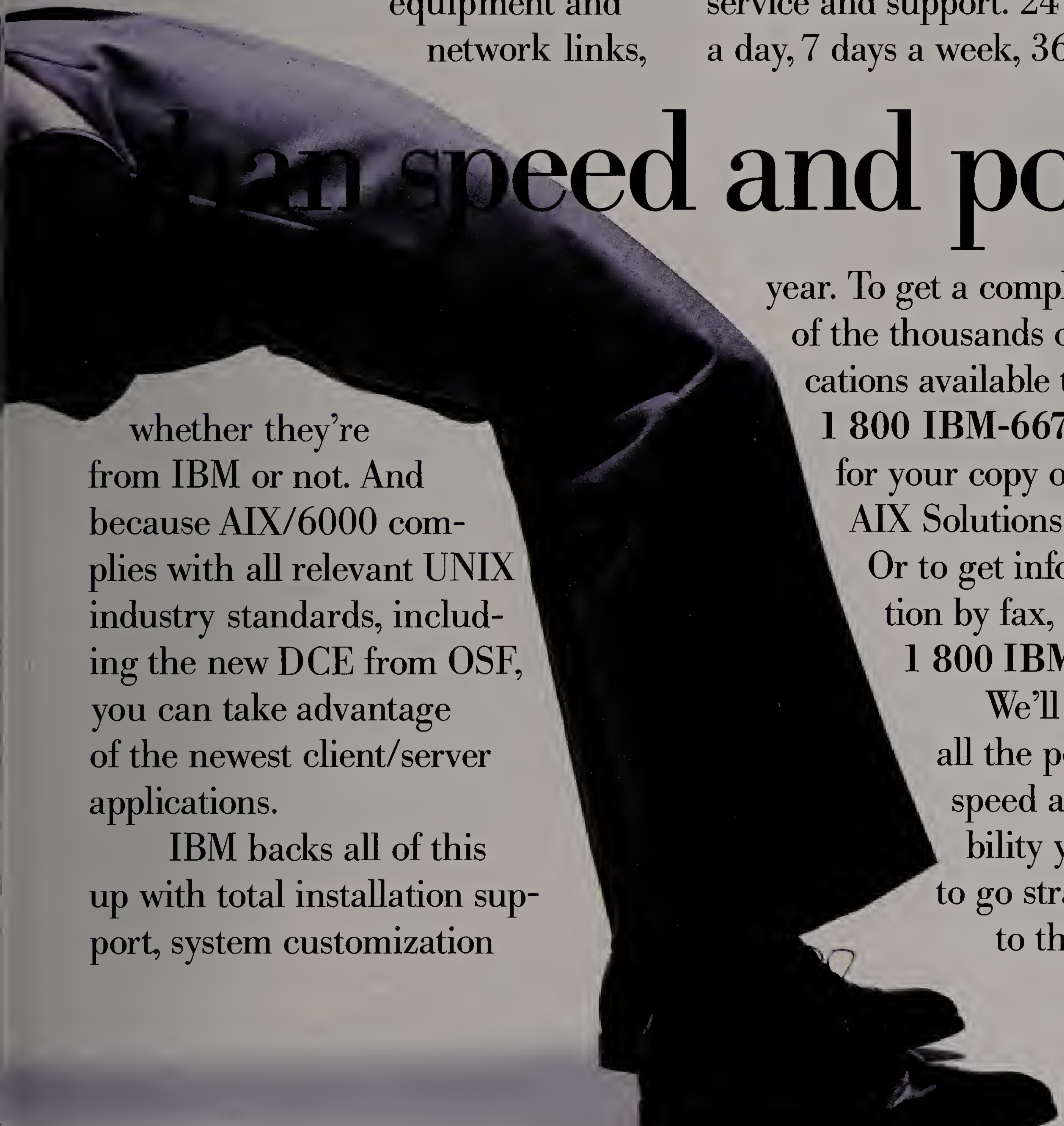

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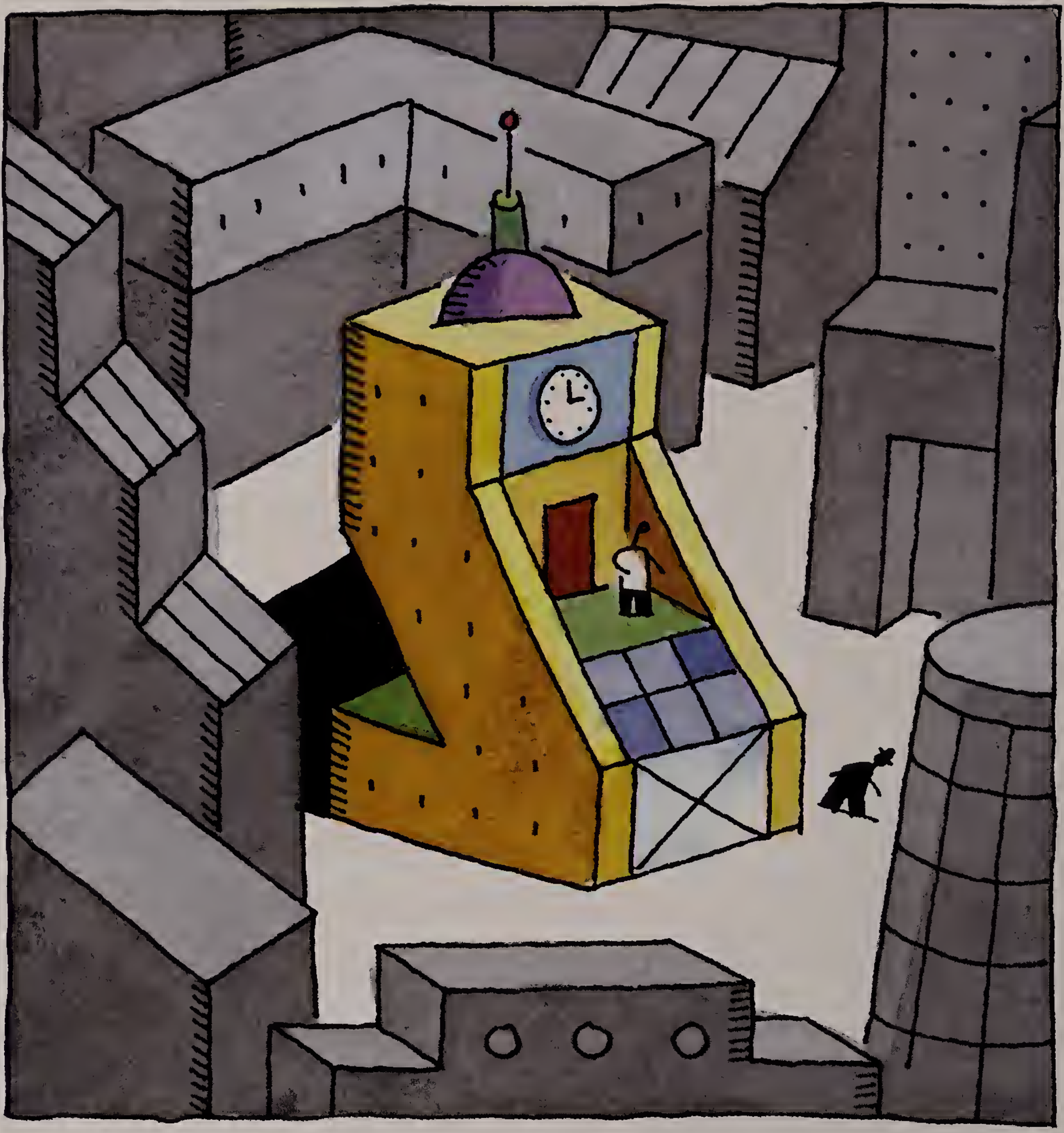

by a factor of x, where x is the number of companies you're dealing with. Technology isn't even the big problem—it's culture."

Even more-traditional companies are starting to wrestle with the precursors of some of these issues. Distributors and corporate customers of Sony Electronics Inc., in Park Ridge, N.J., are shifting their demands from separate components—such as monitors, multimedia CD players and disk drives—toward complete systems, including software. To support this trend, the IS department is trying to integrate the previously independent sets of systems associated with each product group. Responding quickly enough has been a problem, complained Robert Trenchard, senior vice president of MIS. "We still have a lot of mainframe legacy systems," he said, "and they just don't allow us to move as fast as we need to."

But there are hopeful signs as well. Trenchard noted that it took only two weeks to make the necessary changes to a set of warehousing systems that had been developed with CASE tools. Linking a set of inventory and manufacturing systems cut 15 days out of the six-month predelivery life cycle of a line of televisions, saving the company millions of dollars a year. And a new, integrated order-entry system being developed on a client/server architecture should solve the flexibility problems in that critical area. Trenchard hopes the company will soon be able to start integrating some of these systems with those of suppliers and customers.

Trenchard has also reorganized his department to make it easier to assemble temporary teams of analysts and developers around specific projects. In a sense, it's becoming a virtual department. "It's a more-fluid organization now, but there's been some resistance, too," he explained. "People expect to follow a certain career path, with certain titles, and they don't always like it when that path is changed."

To further extend the virtual nature of his department, Trenchard hopes to blur the lines between IS, product development and customers by having his people test the company's new computer products and even write software for them.

Large companies are not alone in feeling pressure to become more flexible and to link their systems with suppliers, partners and customers. SynOptics Communications Inc., a Santa Clara, Calif., vendor of network technologies, is being pushed in this direction by the rapid change and intense competition in its industry. Though the company has been around for eight years, two-thirds of its revenues last year came from new products. "I won't even take on any projects that take longer than three months," said CIO John Dick.

To make sure the projects he does take on bring the company closer to customers and suppliers, Dick has his group practice what he calls "extended IS," which brings customers and suppliers into the company's IS decision-making process. As a result, suppliers are now linked to SynOptics' manufacturing systems to speed delivery and cut inventory, and customers can check their order status by calling a touchtone system that provides either spoken or fax output. Dick would also like to have customers tied directly into SynOptics' order-entry system, but he feels the company's products are too complex to be ordered without assistance. Still, he counts his blessings: "At least we're too young a company to have legacy systems to hold us back," he said.

No one pretends to have easy solutions for the CIOs of companies that are heading down the virtual path. "Being in a complex, adaptive environment means that every CIO is going to have a different set of problems to deal with," said Appleton. The first step may be just getting rid of that old steady-as-a-rock mind-set. In the new virtual order, fast and fluid wins the race. CIO

David H. Freedman is a freelance writer based in Brookline, Mass.

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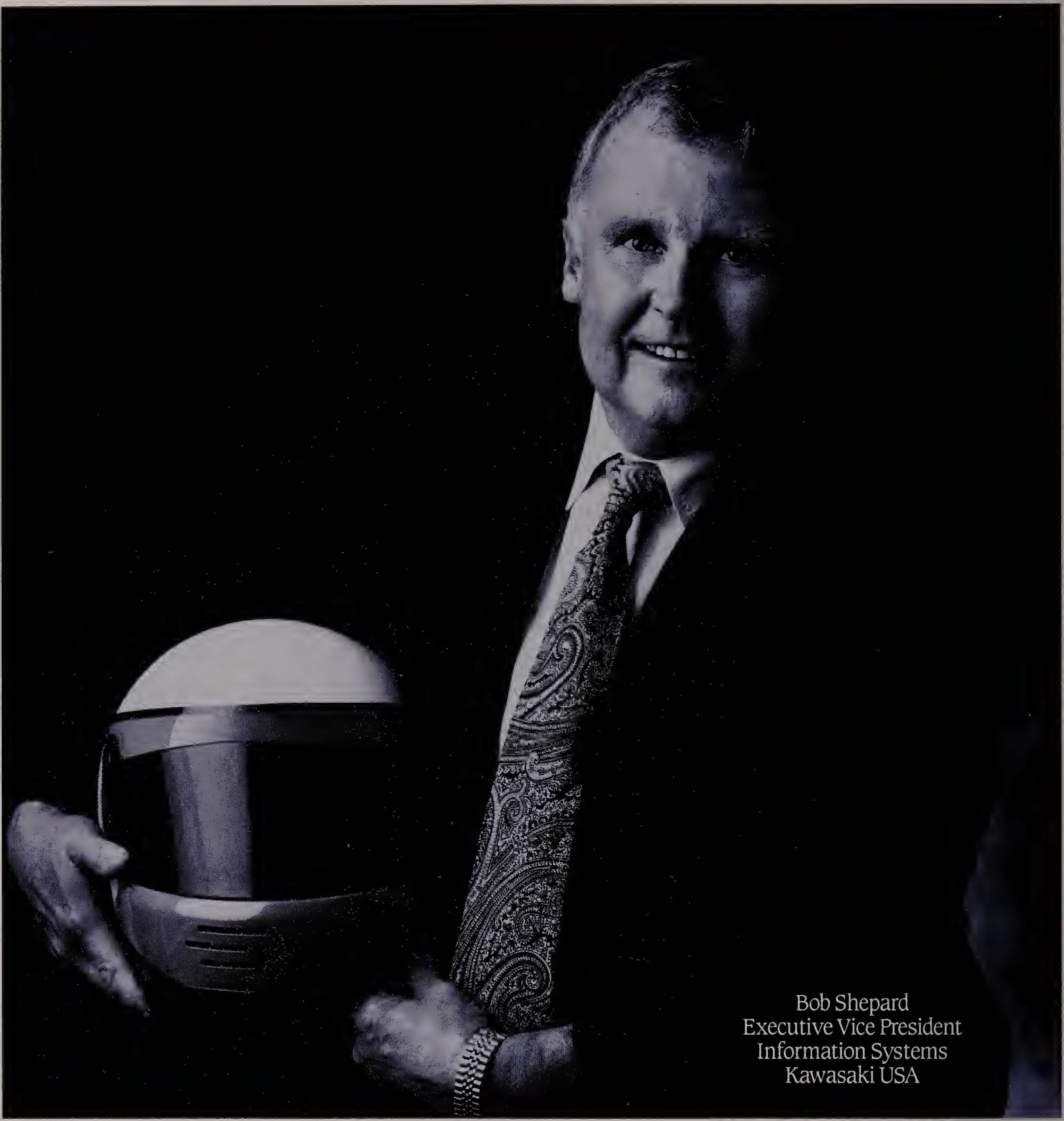

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BUSINESS PLANNING

RECIPES FOR FUSION

It used to be that IS sat around like a too-complacent chef, waiting for businesspeople to come into the IT kitchen and order up some grits. Many of these "pure" technologists felt no particular connection to whatever it was the enterprise did. They could just as easily have been working for Sun Oil as Sun Life—and they saw nothing wrong with admitting that. Slowly, though, the notion of alignment between IS and business goals penetrated organizations, and suddenly an unfelt connection between IT work and corporate goals was a very bad habit that needed breaking. Nowadays, the working mandate goes even further than merely achieving harmony. What's really needed is unity of purpose.

Getting on the Same Page
Forget alignment. These days the word is fusion. There's only one plan—the BUSINESS plan—and everyone in the joint should be working from it.
PAGE 42

Planning Models
Meet a quartet of organizations where the value of strategic union between business and technology is manifested in changing roles and structures, high ambitions and collaborative spirit.
PAGE 48

Being There
Jennifer Thompson's determination to be present whenever strategic direction came up for discussion helped elevate the role of IS in the corporate agenda.
PAGE 56

Finding the Business Future
In matching IT to business opportunities, a good CIO is one part seer, two parts inventor. Or is it two parts seer and one part inventor?
PAGE 58

BUSINESS PLANNING

GETTING ON THE SAME PAGE

Forget alignment. These days the word is fusion. There's only one plan—the BUSINESS plan—and everyone in the joint should be working from it.

BY MICKEY WILLIAMSON

The CIO of a large insurance company—for reasons soon to become obvious, neither man nor company will be named here—spent several years and hundreds of millions of dollars crafting the most sophisticated technology infrastructure available anywhere. Few requests came in from the IS organization's business clients during this period. The CIO—mistakenly, as it turned out—took this to mean his customers were satisfied with the systems they were using, so he dedicated nearly all of his staff and budget to getting ready for the company's next big strategic push, whatever it might be.

While the IS department was thus occupied, the insurance company's performance took a nosedive, and the chief operating officer was replaced. The new COO looked at what the IS department had accomplished with dismay. Instead of seeking ways to reverse his company's financial ebb tide, the CIO had been spending money as though technology were the answer to every problem. "The IS people had their eye on the wrong ball," said Michael Ashmore, vice president at CSC Index Inc. in Cambridge, Mass., and the source of this cautionary tale. "They were focused on technology when they should have focused on what the company needed to succeed." Exit another well-intentioned CIO, victim of outmoded thinking.

Time was when strategic planning for the IS department meant getting ready to respond to requests from the business units, having the tools and equipment on hand to build and run whatever applications the operating departments required to carry out their missions. That was the idea behind alignment, the catchword of the '80s, said John Rollins, partner in Andersen Consulting's Global Information and Technology Strategy Practice in Philadelphia: "Give me the business strategy and that will drive the IS organization strategy and technology plan."

Strategic planning in the '90s means "going beyond alignment to fusion," Rollins said. Corporate goals, business processes, the people who do the work, and the technology, tools and data they need to be effective are interdependent and cannot be considered in

ILLUSTRATION BY STEVE DININNO

isolation, he explained. Waiting for corporate strategy to filter down to the IS department is not good enough, experts agree. The rules of the game are changing, and the role of the IS executive is changing right along with them.

"The old situation was more like a football game," said Jim Ruprecht, systems group manager at the Star Tribune Newspaper of Minneapolis and St. Paul, Minn. (Ruprecht has left the Star Tribune since this story was reported). "Nothing starts until the boss says, 'Go.' All the players know their positions, they know the pass pattern they're going to run, and when somebody blows a whistle, everything stops and they all come back and huddle up again. It's a pretty bureaucratic game."

Today, Ruprecht observes, business is more like a basketball game. "There are still plays, and you know where you're supposed to be when the play starts and when it ends, but how you get from one place to the other is a function of your speed, your strength, your agility and the degree to which you are attuned to what's going on around you. The question is, how can you be a successful IS provider in a world like that?"

One way, said Benjamin S. Porter, Boston-based associate partner and director of research programs for Andersen Consulting's Information Technology and Strategy Practice, is to focus on the leverage—which he defines as the ability to do more and better things—that information technology can provide to the business. It's not a question of laying on technology so that the IS department can start running when someone else says go. Finding opportunities for leverage, Porter said, "puts the IT executive in position to be a full partner in the corporate planning process."

INSTEAD OF turning the corporate strategic plan into a list of applications systems to be built, N. Dean Meyer believes the IS organization should use the plan to "identify which client groups are worth serving."

BUSINESS PLANNING

There's an interesting paradox here. At the same time IS departments are seeking contemporaneous fusion with corporate strategic plans—as distinct from after-the-fact alignment—they are also becoming more discriminating about responding to development requests. Instead of turning the corporate strategic plan into a list of applications systems to be built, the IS organization should use the plan to "identify which client groups are worth serving," said N. Dean Meyer, president and management consultant at N. Dean Meyer and Associates Inc., in Ridgefield, Conn. Having selected target clients, the next step is to "interview them in depth to understand how IS can help them succeed at implementing the strategy," Meyer said. "Then IS implements only those projects that have an identified contribution to that client's role in corporate strategy."

IT'S IMPORTANT TO SEE THE IS DEPARTMENT FROM THE CEO's point of view, said Bernard Mathaisel. "A CEO may choose to tune human resources to perfection to gain advantage over competitors that are emphasizing technology."

This way, people in the business units have as much on the line as the IS department when it comes to the success of new computer systems. They can even help to pitch them, according to Crystal Kennedy, director of information services at The Dannon Co. Inc. in White Plains, N.Y. Instead of the IS executive being responsible for justifying new-systems development to the executive committee, "when it comes to a specific sponsor's project, it's their opportunity to sell the project to the rest of the committee, rather than IS trying to sell it," said Kennedy.

Working as a partner with the business units rather than in a supportive role makes the IS executive more welcome in the executive suite when strategy sessions are underway. Increasingly, however, CIOs are recognizing that the more they can impress senior executives with their technical skills, the less likely they are to be welcome at the table. CEOs don't like to be around people who speak a language they can't understand, Ashmore said. Typically, the CEO will delegate the task to a subordinate rather than deal with a jargon-speaking IS chief. "That's just a way of saying, 'I don't know what you're talking about. Go away,' " Ashmore added. Small wonder that such CIOs are not asked to participate in corporate planning.

There are other reasons, as well. Not all companies are at a point in their development where technology is highly valued as a means to growth. Obviously, the head of the organization that provides technology to the rest of the enterprise is crucial to planning in technology-based enterprises, such as telecommunications firms. But, generally, "it's more a question of how aggressive and progressive the company is than what industry it's in," said Bernard Mathaisel, director of Ernst & Young's Boston-based Center for Information Technology and Strategy.

Mathaisel sees a cycle in the way an industry typically embraces technology. At first, an industry automates to overcome inefficiencies—and probably overdoes it. Then, "when the competition has caught up and everybody is overautomated, often the way to differentiate is to add service in the personal dimension," he said. Finally, when every company has gained parity in customer service, the industry leaders once again embrace automation.

This means that the IS executive needs a clear notion of where the company is in the automation life cycle in order to find the most effective way to help the enterprise achieve its goals. Equally important, Mathaisel said, is to see the IS department from the CEO's point of view, as one of the resources to be deployed—along with operations, marketing, financial and human resources—to further the company's goals. "A CEO may choose to tune human resources to perfection to gain advantage over competitors that are emphasizing technology," he said. In this case, the CIO who continues to act as though IT were the most important part of the business is out of step—if not out the door.

Aligning the IS department with the rest of the business is more a matter of organizational structure than technological infrastructure, said Tauno J. Metsisto, a partner in Andersen's Americas Information and Technology Strategy Practice. If the rest of the enterprise is working toward restructuring itself, doing away with the middle layers of management and putting networked computers on every desktop, then the nature of the IS organization and how it serves its clients has to change as well. "It's no longer effective to have a hierarchical IT organization when you no longer have a hierarchical user organization," he said.

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"I'D TAKE A HARD look at the things I'm doing right and make sure that every one of them is meaningful to the business people. I'd also stop measuring what I'm doing in terms of function points and start measuring what I have done for the business today." -Michael Ashmore

Redesigning the IS organization should begin with an analysis of three distinct but related factors. These are what Metsisto calls "value principles"—the relative importance to the business as a whole of the benefits IT can provide. They can be categorized as "cost, service and leverage," he said. IT can be applied to reduce costs, enhance service to external customers or provide new and better ways to do things; but it's possible that one of these areas of benefit will be more highly valued by business executives. The wise CIO will think carefully about which to emphasize.

Corporate values will suggest new "structural relationships—team structures, organization alignments and insource/outsource options to promote efficiency," Metsisto explained. The organizational structure will also take into account IT's "distinctive proficiencies," exploiting those that exist and developing or compensating for those that are lacking and required to help the enterprise get to where it wants to be.

Understanding the IS organization and its relationship to the company as a whole will help the CIO suggest ways in which technology can further the goals of the enterprise. And talking about the company's goals and not about technology itself is often the key to getting into the room where strategic decisions are made.

Sometimes, though, the IS department and the person who heads it have been perceived as being outside the mainstream of corporate thought for too long to remedy the situation. Whether the head of IS reports to the CEO is a "relatively meaningless" indicator of the person's influence in corporate strategy, Mathaisel said. Instead, he identified some more-accurate markers: "Are you part of the dialogue when the top officers are planning, thinking, dreaming? How much obfuscation, how many bottlenecks, are put in your path when you try to get resources?" he asked. "If I were a CIO and my budget review was agonizing, long and detailed, that's a pretty good signal that I don't have much credibility."

Mathaisel had a piece of advice for "frustrated CIOs in companies where they want to influence the strategic intent, but the company doesn't want them to: Leave. Stop trying to swim up the waterfall. Either adjust or move on."

For those to whom neither option is acceptable, self-examination is the crucial first step in getting involved in corporate strategizing, according to Ashmore. Most technically minded CIOs are investing in the right technology, he said, but they may not be using it to help the business figure out how to solve its problems. "I'd take a hard look at the things I'm doing right and make sure that every one of them is meaningful to the business people," he advised. "I'd also stop measuring what I'm doing in terms of function points and start measuring what I have done for the business today."

If the CIO is not a part of the strategic planning, then executives either don't see technology as strategic, or they don't perceive the IS department as strategic, Meyer said. "In either case, we have work to do to earn that position on the executive committee. We must not demand a role in strategy. We must earn it, by delivering strategic value over time and building everyone's awareness of our contribution to the bottom line."

One way to do that, Ashmore said, is to find some part of the company that is in trouble and offer a concrete solution to its problem. "Imagine somebody who is just about to go under," he said. "If there's something in front of you, you don't stop to think about whether it's actually affixed to the shore. You grab it. So there's a natural place where you can step in and help."

Whether—to use Ruprecht's analogy—the game is more like football or basketball, it still is well worth playing. Earning the right to be a full-fledged member of the executive committee involved in the formulation of corporate strategy is imperative for two reasons, Meyer said. First, "the entire IS business-within-a-business must be managed so as to help clients deliver their strategy. CIOs should participate in that strategy in order to fully understand it. Also, IS can enable corporate strategies that might otherwise be impossible. CIOs should be in the room to point out these opportunities, which might otherwise be missed."

The value of information technology, said Rollins, "doesn't come from technology per se. It comes from a fusion of technology with the other elements of the business. I think we're going to see companies and IS executives getting a lot more from their efforts when they start to think along these lines."

Mickey Williamson is a technical journalist, based in Warwick, Mass., who specializes in emerging technologies. She heads the Qwerty Group.

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MODELS IN THE MAKING

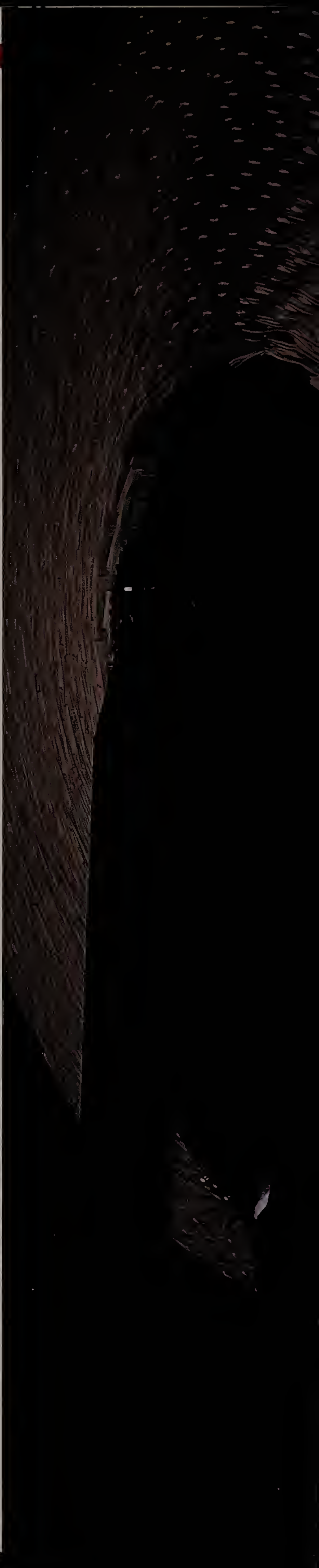
Meet a quartet of organizations where the value of strategic unity between business and technology is manifested in changing roles and structures, high ambitions and collaborative spirit

BY MICKEY WILLIAMSON

The Minneapolis Star Tribune

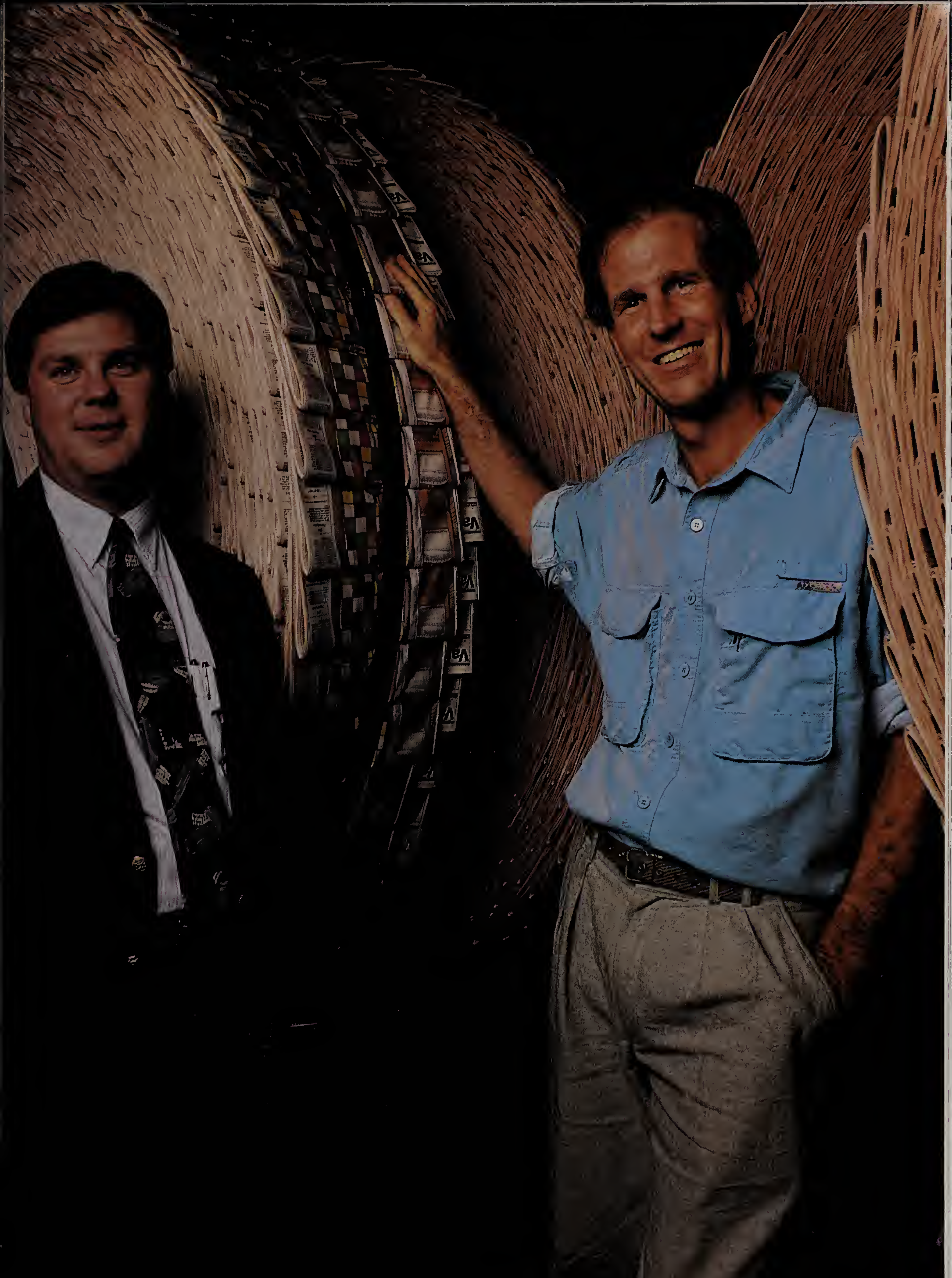
Obtaining support from the people most affected by technological change is a major challenge for Curtis Bok, vice president of manufacturing and systems, and Jim Ruprecht, systems group manager, at the Minneapolis Star Tribune Newspaper of Minneapolis and St. Paul. The Star Tribune's 1993 daily circulation of 413,603 jumps to 695,710 on Sundays. "A large metropolitan newspaper is a very diverse organization," explained Ruprecht (who has since left the company). The news staff has one world view, and the advertising, circulation and production departments all have their own cultures and outlooks as well. Thus, trying to "change the organization in some sort of lockstep fashion is misguided and probably doomed to failure," Ruprecht added. "The way people think about problems is so very different in different parts of the organization that the tools you'd use to create and manage change have to differ as well."

When competition for advertising revenues outside the newspaper industry—cable television, point of purchase and direct mail, among others—became more than just a blip on the radar screen, the Star Tribune "began rethinking itself. It's sort of an Adam Smith meets Citizen Kane kind of story," Ruprecht said. Because the underlying business issues could not be dealt with independently, management formed a cross-sectional project group and dubbed it the continuous-improvement task force. Its mission was



JIM RUPRECHT (LEFT) AND CURTIS BOK: THE STAR TRIBUNE'S EVOLUTION HAS BEEN "SORT OF AN ADAM SMITH MEETS CITIZEN KANE KIND OF STORY."

PHOTO BY PER BREIEHAGEN



to consider the newspaper's structure and role in the community as well as the processes used to get the newspaper into readers' hands.

"THE DAYS OF US DOING IT TO THEM, IN WHICH WE were dictators, or for them, in which we were indentured servants, are gone. Now we're doing it with them."
–Jim Ruprecht

Led by Joel Kramer, executive-editor-turned-publisher and president, a team of line managers from the various departments spent some eight months exploring the newspaper's mission, values and vision. The team concluded that the *Star Tribune* should be "more than just a newspaper. We want to be the provider of preference of information that people value," Ruprecht said.

The IS department had a place at the table from the outset because the systems organization had undergone its own self-analysis process in the late 1980s, "thinking about how to recreate ourselves, what our mission is and how we relate to the user community," said Bok. He is filling in as vice president of systems while the incumbent is on sabbatical, but his other hat, that of manufacturing vice president, makes him the ideal leader for an organization that sees its main role as that of "manufacturing complex engineering products called systems," in Ruprecht's words.

In redesigning the IS department, the predominant goal was "change-adaptiveness," Ruprecht said. "The products we manufacture, the processes by which we manufacture them, and the processes by which we plan and manage those manufacturing processes have to be highly change-adaptive."

Ruprecht sees change as a hierarchy, with the company's mission as the least-changeable part, its strategy and goals slightly more likely to change and, at the most volatile end of the spectrum, the most readily changed processes, technologies and organizational entities. "The more you can anchor the design of your system to those elements that are less susceptible to change, the more change-adaptive your system can be," he said.

As part of the visioning process for the entire company, the task force considered other ways the *Star Tribune* might provide service and produce revenue. For example, it looked at all the types of information people might want, and all the media that can deliver that information. It considered the fact that the *Star Tribune* has in place a distribution system that passes every door in its market area and thought about other things that the distribution system might handle.

One effect of cross-cultural strategic planning is that development teams these days are cross-cultural affairs as well. IS professionals and members of the operating units work side by side translating business plans into CASE models, using tools from KnowledgeWare Inc. When a group is clustered around a PC, you can't tell which people represent which disciplines, Ruprecht said. "You can't tell by who's sitting in the driver's seat, and you can't tell by the language they're using." Each side has picked up some of the other's vocabulary. Ruprecht likens it to building a house: "The contractor has to learn a little about the language your family uses, and your family has to learn a little about the language of the contractor."

Relationships between the systems people and those they work with have changed considerably, Ruprecht noted. "The days of us doing it to them, in which we were dictators, or for them, in which we were indentured servants, are gone," he said. "Now we're doing it with them."

Fluor Daniel Inc.

At Fluor Daniel Inc., an Irvine, Calif.-based engineering and construction company, Vice President of Information Management Bill Mazilly has the most visible role imaginable. He is leading a corporate project whose goal is to increase productivity by 50 percent while decreasing resources by the same figure.

Mazilly, who sees this as a five-year project that, in another sense, "will go on forever," said that success, when it comes, will benefit not only his company but also the entire industry. Outsiders may find it hard to believe that a company that builds complex structures such as power plants and hospitals is "very much lagging in the use of technology," but that is how Mazilly described the entire construction industry. "Virtually everything we do is based on sets of rules, but we are just barely scratching the surface in the use of knowledge-based systems," he said.

The project began in November 1992. Instead of assuming that technology is the answer to everything, Mazilly and his 25-member project team first considered the way the company does its work now. Then they developed a vision of how work will be done in the future. Only after five months of examining every process and every deliverable have they begun to look at technology as a means of turning that vision into reality.

Two years ago and 18 years into his career at Fluor Daniel, Mazilly was asked to head the information-management organization, replacing a more-technically oriented CIO. Until then, most of his work had been on the operations side of the enterprise. "I was given the opportunity because I understood more about the business than about technology," he said. "I've had to learn a lot about technology in the last couple of years."

Mazilly recognizes that the stakes are high, but failure has no place in his thinking. "There is no rocket science in this," he said. He believes that Fluor Daniel will succeed because the company has the intelligence and financial resources to carry out its plans, but more important, it is "an organization with management that is supportive of dra-

BILL MAZILLY: FLUOR MANAGEMENT IS "SUPPORTIVE OF DRAMATIC CHANGE, AND THAT IS WHERE WE WILL OUTSHINE EVERYONE."

PHOTO BY STEVEN BURR WILLIAMS

matic change, and that is where we will outshine everyone. It takes a management group that has the ability to understand the impact of change and to weather the storm." Storms are inevitable any time you try to change an organization of 40,000 people, Mazilly added.

When it comes to implementing the changes, Mazilly sees the information-management organization as a catalyst rather than a commander. "We tend to be the facilitator between functions, as opposed to dictating to any of them," he said.

Mazilly identified two things he wishes he had done differently at the outset. He regrets not having done more research among other highly process-oriented industries to gain the benefit of their experiences. Also, Mazilly said if he had a second chance, he would spend more time consulting with people not involved in the planning, with the goal of gaining more "buy-in along the way."

RICHARD KRAVCHUK (LEFT) AND CRYSTAL KENNEDY: DANNON'S CULTURE FOSTERS CLOSE COOPERATION AND INTERACTION BETWEEN I.S. AND USERS.

PHOTO BY KENT HANSON

The Dannon Co.

The Dannon Co., that culture of cultures, has set out on a quest for new capabilities to enhance the way people work. "We've gone almost as far as we can with making productivity improvements based on streamlining manual work flows," said Richard Kravchuk, director of strategic information management at the White Plains, N.Y., dairy-products manufacturer.

With cost control and product differentiation as major business strategies, Dannon's focus these days is on the way its managers make decisions. The idea, Kravchuk said, is to streamline decision-making so that fewer people work at analyzing data and more are presented with information on which they can take action.

One of the first results of that focus is a marketing system that helps sales managers get the greatest impact from their marketing investments. Pressed for time, the IS department scrapped the normal system-development lifecycle and used automated tools to help it bring the system online in just 10 weeks. Members of the user organization headed the design team, assisted by an outside consultant and key people from the IS department whose job it was to help the users understand how Dannon stores its information. "We met halfway," Kravchuk said. "We had to learn their business, but in the process they began to learn ours."

I.S. AT DANNON IS NOW REGARDED by other managers as "an equal partner. We're not just recipients of the decision."
-Richard Kravchuk

Kravchuk's position may be unique in the industry. As director of strategic information management, his brief is to assemble interdisciplinary teams to implement new technologies that advance the company's strategic goals. Kravchuk described his role as "tenuous. Every year I have to come up with a set of projects to justify [the fact that] I'm here," he said.

With no one reporting to him, Kravchuk assembles project teams by approaching other directors and line managers. Crystal Kennedy, director of information services and Kravchuk's next-door neighbor on the organization chart (both she and Kravchuk report to the vice president of finance), provides the development staff. The new system's sponsors typically furnish people to handle project management and provide business expertise. Crucial to Kravchuk's success is the support of the entire executive committee, he said.

Running counter to conventional practice, Dannon's IS department is structured so that talented systems engineers don't have to change jobs in order to move up the compensation ladder. Software developers can be paid more than the people who manage them, Kravchuk said. In order to attract and retain the kind of technical talent required to accomplish Dannon's strategic goals, it was important to provide a career path that allowed earnings to increase without forcing developers into management, he explained.

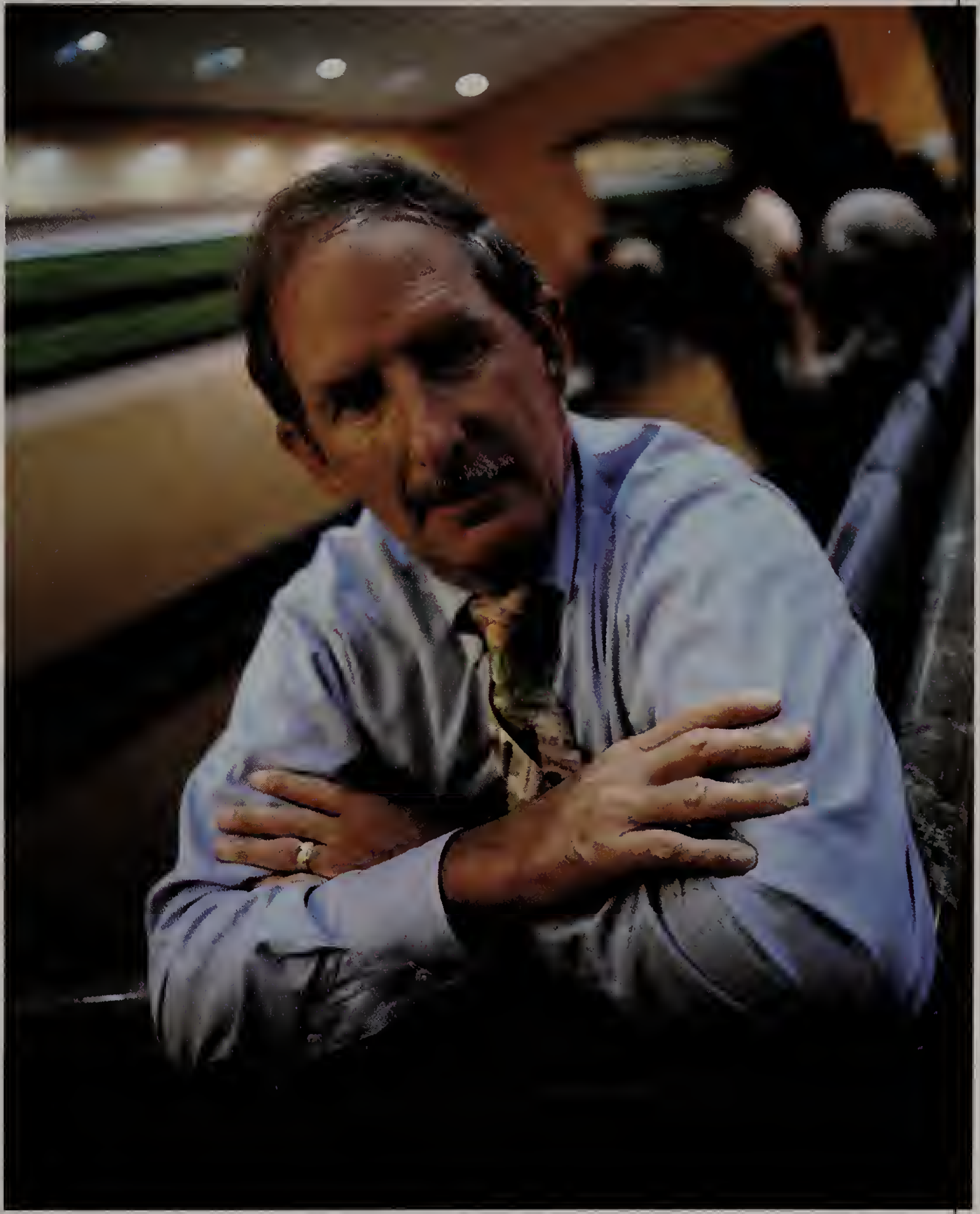
Working with the business managers has given Kravchuk the credibility required to keep him involved in strategic decision-making. "Managers seek us out earlier in the process now," he said. "We've become an equal partner and not just recipients of the decision."

Charles Schwab and Co.

Mark Barmann, executive vice president and CIO at discount-brokerage firm Charles Schwab and Co. in San Francisco, is one IS executive who never had to jockey for position at the planning table. He reports to the president of the holding company of the corporation—"a positional, hierarchical happenstance that thrusts me into discussions on all aspects of the firm's plans and activities," he said.

Educated as an engineer, Barmann has never held "an intensely technical job. I think of myself more as a manager than I do as a technician," he said. Technology, though, is the basis of Schwab's discount-broker fees: A voice-response system lets customers place orders and check order status at any time from a touch-tone telephone. "It can be imitated, and it's not unique, but it was early, it's heavily promoted, and it's priced to encourage customer use," Barmann said. "Upwards of 20 percent of all our trading transactions are entered through that channel." Schwab also offers an online real-time trade-execution system that is unique in the industry.

The IS department has never had a credibility problem at Charles Schwab. "Our firm is only 18 years old, and it's run by men and women who have never known a time when IS wasn't at the very core of the business," Barmann said. "Also, our very cost structure is predicated on having a heavy technological component."



MARK BARMANN: SCHWAB IS A YOUNG FIRM WHERE I.S. HAS ALWAYS BEEN "AT THE VERY CORE OF THE BUSINESS."

PHOTO BY DAVID POWERS

Barmann sees the question of whether an IS executive will be perceived as a technical or business manager as largely a matter of personal choice. "People have to decide how they will devote their energies," he said. "If men and women decide to try to stay abreast of this rapidly evolving technological explosion we're involved in, then they won't have the energy left over to stay abreast of the business. If they let go of some of the technical stuff to competent subordinates and wrap their heads around the business instead, then I think they can prepare themselves for the kind of job that I have." CIO

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BUSINESS PLANNING

INTERVIEW

BEING THERE

Jennifer Thompson's determination to be present whenever strategic direction came up for discussion helped elevate the role of IS in the corporate agenda

BY MICKEY WILLIAMSON

When her company embarked on a program of strategic self-analysis, Jennifer Thompson, vice president of information services at Canadian Tire Corp., saw an opportunity to change the way management views the IS organization's place in the corporate constellation. Canada's largest hard-goods retail chain (don't be fooled by the name), the more-than $3 billion (Canadian dollars) Toronto-based company was facing increased competition. "We've been a very successful organization, but we were not satisfied with how we were growing," Thompson said.

Thompson employs a variety of techniques designed to "help the business [managers] see systems as the air that they breathe," she said. Her goal is to be present whenever corporate strategy is under discussion. "It's a struggle," she admitted. "There's a traditional thinking regarding systems that says the business has to know what it wants, then it has to tell systems what it wants done."

The path her career has taken since she came to Canadian Tire in 1991 is a telling indicator of the success of Thompson's approach. She started with the company as a senior director and soon became a divisional vice president. In May 1993, she was named vice president of information services. "I've had much the same job all the way through, but the organization has elevated the role of systems," she said.

Compounding what she called "that over-the-wall kind of thinking" when she launched her campaign was the fact that the company had an entirely new management team, whose members felt no responsibility for the systems their predecessors had sponsored. "In a typical company, there is a degree of ownership for what you already have and, therefore, a preparedness to either invest in, rebuild or scrap those assets," Thompson said. These new executives simply announced their plans and "left the part about how this relates to what [systems] we already have up to us."

Thompson views management's laissez faire attitude with ambivalence. "On one hand, it shows an incredible amount of trust. On the other hand, it shows a certain amount of abdication of the business from its responsibilities," she said. Thompson felt she was being asked to make technology decisions in a vacuum. "Therefore, I told them that we had to work together," she said.

Thompson limits her bid for involvement in strategic decisions to those she considers most important. She provides resources to help with data-gathering and -benchmarking and furnishes information on what competitors are doing with technology, "but I don't feel I have to be there for some of the lengthy discussions where they dissect the business," she said.

But as soon as management starts trying to draw conclusions from the data and base plans on those conclusions, Thompson wants to be included. "I feel that it is important for IS to be in the room to contribute, to challenge and to bring up ideas based on our knowledge of what systems can and cannot do for them," she said.

On a scale where zero means sitting on the bench and 10 means quarterbacking the play, Thompson sees herself at about four. She got this far by paying close attention to the concerns of senior management and by talking with them in their own language. She tries to use familiar metaphors—"so many metaphors that I sometimes cringe, but then I start hearing them talk to each other in the same metaphors," she said.

Her favorite image is that of a house. "We all live in this house, and there are things we like about it and things we don't like," she'll tell managers. "We have new things we want of this house, but we're going to be living in it while we're renovating, so we'll have to be careful that when someone decides to paper this wall, there isn't somebody on the other side talking about tearing it down.

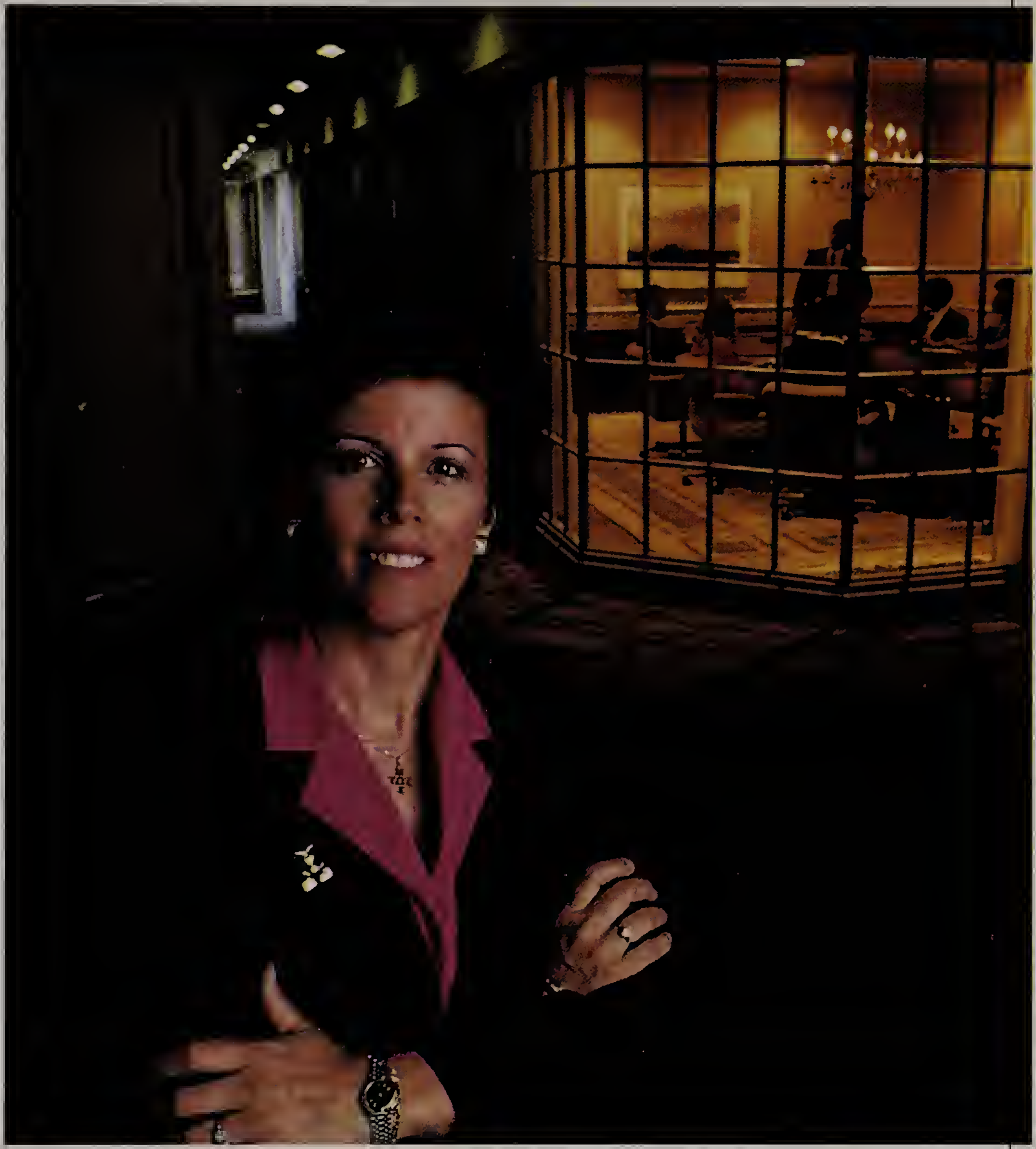
"They can identify with that," Thompson said. She added that she might also tell a manager, "I happen to know that the electrical wiring is in [that wall]. You probably don't want me to explain where I have to put those wires, but I want you to appreciate that I do have to figure out where they are going before I get out the sledgehammer."

Thompson has pointed out to managers that "they can't treat the house as though they each own a room in it," because what happens to each room affects all of the others. To explain the infrastructure required to support all systems, she drew an analogy to the drainage tiles (Canadians call them weeping tiles) that surround the foundation of a house.

"Nobody wants to spend $20,000 on weeping tiles, but you'd better spend it before your basement is flooded," she said. "I told them there are things that nobody wants to pay for, but not paying for them has a fundamental and significant impact."

Thompson sends managers a steady flow of articles on today's hot technology issues, written from the business point of view, providing both sides of each story. Once, for example, she circulated an article on the pitfalls of client/server computing the same week she circulated a success story on the same subject. "I don't want [management] to think of it as simple, but I don't want them to think I'm overwhelmed by complexity, so I spend some time making them feel nervous and some time making them feel confident," she said.

Thompson said she is beginning to be invited into the board room, where appreciation for the strategic potential of information systems ranges from fairly sophisticated to nonexistent. "They're asking, 'Can we do that? How difficult is it?' And, in some instances, 'Are you getting all the help you need?' " CIO



JENNIFER THOMPSON PAYS ATTENTION TO THE CONCERNS OF SENIOR MANAGEMENT AND TALKS WITH THEM IN THEIR OWN LANGUAGE, WHICH INCLUDES A HEAVY USE OF METAPHORS.

PHOTO BY PETER TANG / FIRST LIGHT

BUSINESS PLANNING

FINDING THE BUSINESS FUTURE

In matching IT to business opportunities, a good CIO is one part seer, two parts inventor. Or is it two parts seer and one part inventor?

BY MICKEY WILLIAMSON

Information technology is finally coming of age as a strategic business resource by allowing companies to meet their customers' needs regardless of time and place, according to C. Rudy Puryear, Chicago-based managing partner in charge of Andersen Consulting's Americas Information and Technology Strategy Practice. "Businesses spend enormous efforts today dealing with time and location barriers. As technology begins to help us eliminate those [considerations], business becomes radically different," he said.

Consider banking, Puryear suggested. "In the '70s, when you had to do banking, you went to the bank. Banks spent enormous sums of money decorating their lobbies with high-vaulted ceilings and all kinds of artwork." Then came branch banks, then automatic teller machines (ATMs), and now you can do your banking with a touch-tone telephone or a home computer. Similarly, providers of all kinds of services "are finding ways to get the consumer's need satisfied, wherever the consumer is," he said.

"The trend poses some interesting challenges and risks for businesses," Puryear pointed out. It also provides an opportunity for IS chiefs to stimulate creative strategic thinking in the executive suite. "We get incredible creativity and innovation when [we challenge people] to start thinking about how they could do business differently if they were not constrained by time and place."

Technology has long been engaged in changing the ways in which people obtain goods and services. "Thirty years ago, if you wanted to watch a movie, you went to a theater," Puryear said. "Twenty years ago you might wait for the 'Sunday Night Movie,' 15 years ago you could turn on cable television, and 10 years ago you could go to the local video-rental chain and rent the tape. Two years from now you will dial the movie down using your touch-tone phone, right into your TV set."

Think of the challenge that prospect poses to video-rental chains. "They could do the best job in the world building systems and reengineering processes to get tapes onto the shelf, but that won't get them where they want to be," Puryear said. "Their challenge is to take an existing distribution structure and capitalize on it, recognizing that what they distribute three years from now may not be videotapes."

Similarly, within a few years motorists will

solve many automobile problems without visiting the service station. “If I’m on the highway and I experience a problem, I’ll pull over to the side of the road, take an electronic probe out of the glove compartment, plug it into the cellular phone and dial an 800 number that connects my car to the electronic service bay, which does the diagnosis and sends a software fix down the line,” Puryear predicted.

As a byproduct of these advances, he continued, the logistics of doing business wherever the consumer is will become far more complex, to the extent that “information about the business may in fact be more valuable than the underlying business.” Some examples already exist, Puryear said. For instance, “the publishers of the *Official Airline Guide* make more money than all the top 10 airlines combined. The net-asset value of *TV Guide Magazine* is worth more than the net-asset value of ABC, CBS, NBC and Fox combined.”

Puryear advises CIOs to be sure they focus technology investments on ways to bring new business values to their organizations, as opposed to improving the way they are doing things today. “Suppose they generate 3,000 invoices an hour now. Instead of focusing on how to generate 5,000 invoices an hour, or how to cut the cost of an invoice, [the CIO should be] saying, ‘Can I eliminate invoices? Let’s find a way to form links to our customers that make it far more convenient for them to do business with us. Is there a way with technology that I can help my organization open new battlegrounds?’ ”

CIOs, he concluded, must become “very sensitive to what time- and location-independence can do to business. Therein lies an immense amount of value and a radically different kind of business environment from anything we’ve seen before.” CIO

“IF YOUR BUSINESS over time may become a commodity, is there a way that information about the business is the next value-added service?”
–C. Rudy Puryear

ILLUSTRATION BY STEVE DININNO

JOINT VENTURES

When senior business and IS executives get in harness together, the results can be impressive. SIM's seventh annual Partners in Leadership Award honors the achievements of close cooperation.

BY JASON S. CASEY

BUSINESS AND TECHNOLOGY—like the right and left sides of the brain—work together to produce innovation, creative solutions, progress. When the two sides of the brain are out of synch, you get a dysfunctional organism; when IS and business are at odds, a failing company. But when a CEO and a CIO form a true partnership, it can set the tone for an organization-wide alliance of business and technology—and corresponding improvements in speed, productivity and customer service.

The Partners in Leadership Award, sponsored by the Society for Information Management (SIM), an IS professional organization headquartered in Chicago, recognizes the best of such symbiotic relationships. This year's award was presented to JC Penney Co., the Dallas-based retailer, and Nalco Chemical Co., a supplier of water-treatment chemicals in Naperville, Ill.

"The award recognizes the very best in cooperation," said Brandt R. Allen, a professor at Colgate Darden Graduate School in Charlottesville, Va., and a member of the award-selection committee. "The recognition is not just for the best application of a technology, but for a unique partnership between a senior-level business executive and a senior-level IS executive."

For two people who have worked together as long and as closely as Edward J. Mooney and David R. Bertran, partnering is the natural way to get things done. Over 10 years at Nalco Chemical, the two have become professionally intertwined. "It's rare that we don't talk to each other at least once a day, and it's usually more like two, three or four times a day," said Mooney, Nalco's president and COO. "We know each other well; we know each other's families. We work together about as closely as any two humans can work together."

Mooney and Bertran, who is senior vice president of manufacturing and logistics, consult regularly on every aspect of the business, and generally their goals for Nalco are the same. So when Mooney in the late '80s defined Nalco's mission as satisfying the customer, Bertran responded with a plan for deploying IT at the point of sale.

The IS vision was this: a sales force armed with laptop computers and software that would allow reps to perform on-site analysis, communicate remotely with automation equipment and develop customized chemical-treatment solutions complete with demonstrated costs and benefits. N-COMPAS, as the new system was called, would let sales reps "sit down with a customer and input into the laptop the characteristics of the customer's water and the parameters associated with the operation of the customer's plant," said Bertran. "Then they can run through various scenarios to simulate the benefits of our chemical products in their processing systems."

Bertran sold the concept to Mooney, and Mooney convinced the board of directors to allocate $1.8 million for a pilot. "I became an advocate once I saw some examples of the problem-solving enhancements that would occur in the field," said Mooney.

Bertran and Mooney assembled a team of representatives from IS, sales and marketing and charged it to focus unswervingly on

BERTRAN *and* **MOONEY**: *Nalco's point-of-sale system made a quantifiable positive difference in customers' decisions to choose Nalco.*

PHOTO BY NEIL MACDONALD

customer satisfaction. "We told them we were not going to expand the program at all unless they could show us a measurable improvement," said Mooney.

The team began by equipping 250 members of Nalco's 2,000-member worldwide sales force with the software, running on 386-based laptops from IBM Corp. and Compaq Computer Corp. In the first six months of the pilot, the company rang up more than $14 million in new sales and $12 million from troubled accounts that were salvaged as a direct result of the system.

When an independent firm surveyed 800 customers serviced by N-COMPAS, 42 percent strongly agreed that the system significantly improved customer satisfaction, and 56 percent said it made a substantial difference in their choice of a supplier and improved Nalco's ability to retain business.

THE PILOT WAS SO SUCCESSFUL, Mooney said, that when he went back to the board to request another $5.5 million, "their first question was, 'what took you so long to come back?' Their second question was, 'are you sure you've got enough money so you can do this as quickly as you need to?' "

During the development phase, IS personnel went out on sales visits so they could study customer requirements firsthand. The first unit rolled out went to Mooney, who, like all of Nalco's officers, makes regular sales calls. "Ted's as conversant in the use of N-COMPAS as anyone," said Bertran, who takes the system on visits to his own accounts several times a quarter. "He's learned how to use it and what makes it tick."

One area where Mooney's leadership proved critical was in forcing the company's 12 business groups to adhere to corporate standards. "If it hadn't been for Ted, we would have ended up with a hodgepodge of equipment and software that would have been impossible to manage," said Bertran.

"The business groups all focus on different market segments, and they're very autonomous," Mooney explained. "You have to herd them together and explain why it's good for them in order to get their participation and make it work across the company."

The collaboration on N-COMPAS continues, as Bertran and Mooney discuss methods for monitoring their customers' equipment remotely. They're also in the process of upgrading Nalco's worldwide manufacturing and logistics systems.

"I think one of the most important

OESTERREICHER *and* **EVANS:** *At Penny, IS is a trigger for strategic thinking.*

things is this project has given the IS group a lot of pride and self-satisfaction,” said Bertran. “This is probably as close as IS can come to contributing to an actual sale.”

VERY OPEN” IS HOW JC PENNEY’S president, James Oesterreicher, characterizes his relationship with Vice President and Director of Information Systems Dave V. Evans. While the two don’t meet as often as Nalco’s business and technology leaders (“formally three or four times a year and informally—depending on the projects—maybe another three or four times,” according to Oesterreicher), they are readily available to one another whenever a problem arises. “We live in the same neighborhood,” said Oesterreicher. “If I have to see him real bad, I’ll walk down the street.”

That collaboration is essential because, in the cutthroat world of retailing, customers will take their business elsewhere if they don’t find exactly what they want. Penney must “provide the merchandise that’s wanted by our customers faster and more precisely,” said Oesterreicher. “A lot of our technology has aimed at being more precise by size and color and getting merchandise in [to the stores] quicker.”

“Our company has a pretty long tradition of investing in technology when it can be demonstrated that there’s a solid business result,” said Evans. For example, selling the initial $200 million investment in an elaborate POS system back in 1988 was “no challenge at all,” Evans said. The POS system improves Penney’s ability to capture data about customer purchases, which in turn feeds a new inventory-replenishment system. The implementation involved 50,000 devices in 1,300 locations; 100,000 associates needed training, and 4,000 suppliers had to change the way they marked merchandise. It was a massive project, and Oesterreicher’s enthusiastic support was essential to its ultimate success.

While replenishing inventory rapidly is critical, so is getting new merchandise out to the floor where customers can buy it. Over the last two years, Penney has phased in an “advance ship notice” system that allows suppliers to transmit detailed electronic records of their pending shipments. Employees on the receiving dock scan each carton’s bar code for a serial number and match up that information with the electronic record, allowing them to process the shipment quickly. The system has reduced the receiving process from nearly four days to about half a day, according to Evans.

As for its relationships with suppliers, Penney is heavily promoting EDI. About 3,000 of the company’s suppliers are currently using EDI; about 93 percent of its purchase orders and 77 percent of its invoices are transmitted electronically. The retailer is also working to “exchange information that would help both [Penney and its suppliers] forecast better,” said Oesterreicher. “We provide them with many of the historical sales and future projections of our merchandise.”

Oesterreicher sees IS as both a catalyst and a problem-solver at Penney. “IS causes line organizations to think strategically about how we will do business in the future,” he explained. “And then each area has a long wish list of things that they’d like to accomplish. Dave and his group take that wish list and help us to see how it fits with our business strategy.”

Technology initiatives come both from IS and from field operatives throughout the organization. “Dave is very skilled in assigning priorities—helping us put [these suggestions] in the proper order based on where we’ll get the highest return,” said Oesterreicher. “It’s my task to help him order those priorities.”

The close relationship between Oesterreicher and Evans is typical of the team-oriented company, where IS and business units routinely work together to select solutions, conduct pilots, measure results and offer training. This approach “helps us gain acceptance throughout the organization and solves an awful lot of implementation problems,” said Oesterreicher.

With the same goal in mind, IS is moving away from a centralized, monolithic structure. “We’re co-locating some of our systems leaders with the business partners they work for and giving them a dotted-line reporting relationship to make the system people more sensitive to what the business is facing on a day-to-day basis,” explained Evans. “The sense of partnership that this award is trying to capture has, I think, spread down into the organization, to the teams that actually work together to build these things.”

PHOTO BY KEITH WOOD

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Keeping Secrets

Companies that can't adequately protect trade-secret or copyrighted material may lose the use of critical technologies and have to pay damages into the bargain

BY TOBEY B. MARZOUK

Whenever an IS executive licenses software or other high-technology goods, the vendor imposes restrictions on their use, copying and disclosure. If these restrictions are violated, the vendor may not only terminate the license but claim damages as well.

To avoid these consequences, CIOs need a program to protect copyrighted and trade-secret material acquired from software vendors and other technology suppliers. The program should include methods for negotiating and monitoring contractual obligations, and for implementing policies to protect trade secrets and comply with copyright law. It should also make provisions for obligating employees and consultants to abide by these policies.

For information or technology to be considered a trade secret, it must meet three conditions. First, it must be maintained as a secret by the supplier. Disclosure is permitted if the party to whom the information is passed on—the software user, for example—knows that it is confidential and subject to nondisclosure and limited-use requirements. Second, the information must give its owner an advantage over competitors that do not know it. Finally, the information must be not generally known in the industry. Most software is considered unique because it involves numerous algorithms and programming decisions that vary with each program and programmer. A unique combination of generally known information may also constitute a trade secret.

Trade-secret law does not apply when a user independently develops a protected product or process. The user company, however, may find it extremely difficult to prove that it did not copy the technology from materials provided by the supplier. If independent development does occur, the result remains a trade secret as long as both firms maintain its secrecy. But when either firm publicly discloses the information, trade-secret status is lost for both. (If trade-secret status is lost, the information may still be protected under copyright law.)

Unless specifically prohibited by the license agreement, a user with lawful access to computer code can probably reverse-engineer that code—starting with the known product and working backward to find out how it was developed. For software, this means starting with the object code (the machine-readable code that the computer executes) and working backward to the software's source code (the human-readable code in a programming language, such as Cobol).

Licenses that provide access only to the object code—a typical way of protecting trade secrets in the source code—may prohibit users from reverse-engineering the object code.

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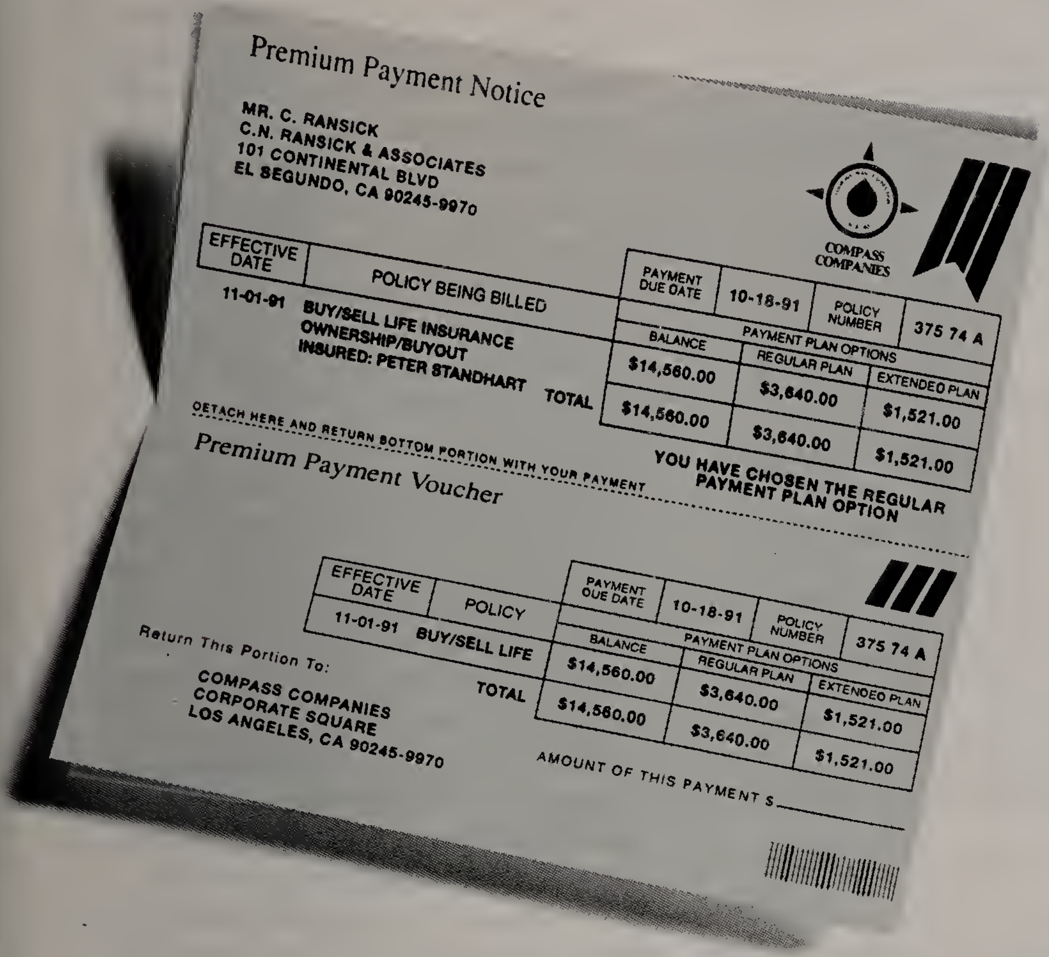

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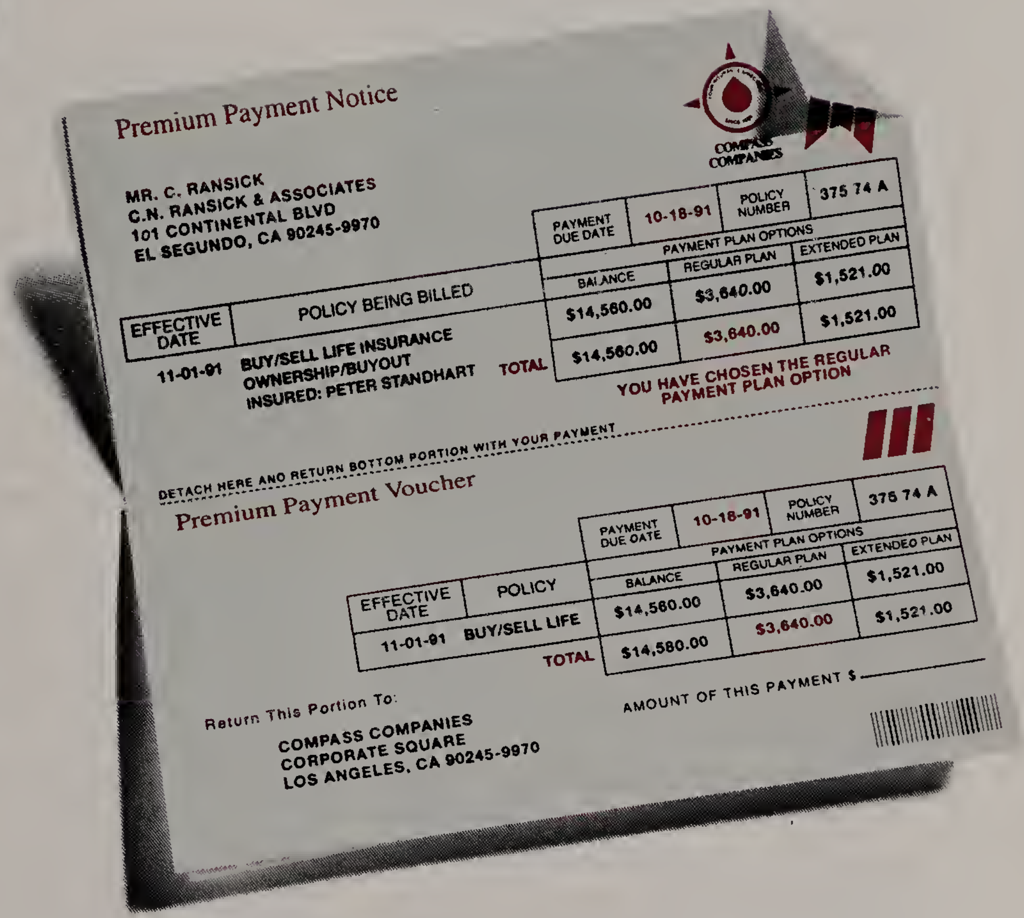

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By requiring users to rely on the vendor for all software-support services such as error corrections and enhancements, the vendor significantly reduces the likelihood that trade secrets will be misused or disclosed.

Software is also protected by the federal Copyright Act, which prohibits anyone but the copyright owner from reproducing it (a licensed user may maintain one archival copy), preparing derivative works by modifying it, or distributing copies by sale, rental or lease. A trade secret can receive copyright protection if it is fixed in a tangible medium of expression—such as a diskette, hard drive or program listing—and has some degree of originality.

There are a number of ways companies can reduce the danger of infringing the supplier's trade secrets and copyrights.

Avoid unreasonable restrictions when acquiring products. Companies should carefully review the limitations in license agreements for new software products and determine whether their business activities and internal procedures will make it possible to comply. In some instances, the IS executive should consider negotiating more-flexible, less-burdensome provisions. The goal is to balance the supplier's legitimate need to protect its crown jewels with the user's need for maximum flexibility.

For example, a supplier may require that all employees with access to the software sign confidentiality agreements. During negotiations, an IS executive could request that this requirement be eliminated, on the basis that all employees already have entered into sufficiently broad confidentiality agreements and are required to maintain the confidentiality of third-party information.

Implement a comprehensive program to protect both proprietary company information and all trade secrets acquired under license agreements. Depending on the firm, the following security measures may be needed to adequately protect confidential information:

- Limit access to computer programs and proprietary business data on a need-to-know basis.
- Limit access to sensitive areas to approved personnel only. Keep such areas segregated and securely locked.
- Institute formal sign-out procedures in tape libraries. Restrict tape-library access to designated individuals.
- Place terminals in segregated and safe areas. Use passwords or keys to limit access to sensitive files and make sure they are changed periodically.

By requiring the user to rely on the vendor for all software-support services, the vendor significantly reduces the likelihood that trade secrets will be misused or disclosed.

- Monitor all copying of software, manuals and other confidential documents.
- Carefully dispose of paper, tapes, notes and other trash.
- Periodically instruct all personnel of security precautions. Post warning signs and security notices when appropriate.
- Exclude all terminated employees from access to confidential data. If an employee leaves on bad terms, take further precautions such as changing passwords and keys.
- Label confidential information as Secret and Confidential.
- Instruct employees not to leave confidential data unattended.
- Monitor and review speeches and publications to ensure that employees do not divulge trade secrets and confidential data.
- Periodically review the company's security program.

Obligate employees to protect trade secrets and copyrighted material. The company is usually liable if an employee improperly uses, copies or discloses protected materials. Although employees generally are under a fiduciary duty not to disclose such information, contracts with confidentiality provisions provide notice of these obligations, potentially deter improper conduct and make enforcement easier.

An employer's failure to comply with certain procedural and legal requirements, however, may nullify an employment contract or preclude its enforcement. Employers, therefore, should follow these guidelines when entering into such contracts.

- Watch what is said during contract negotiations. Even though a contract may prevent an employee from enforcing oral commitments not included in the contract, a court may rely on an employer's oral statements to determine the meaning and intent of the parties. In one recent case, a company was prevented from firing an employee because of oral promises made during an employment interview and written assurances in the employer's personnel manual.
- Give the employee ample opportunity to review the contract. Often, companies will present a proposed contract to new employees on their first day of work, giving them no meaningful opportunity to review it or negotiate specific terms. The company should provide a copy of the contract before the start of employment to guard against allegations that an employee was at a disadvantage relative to the employer.

In one court case, a man accepted employment with an engineering firm in West Virginia. He canceled his housing lease in Washington, signed a contract to purchase a home in West Virginia and moved all his personal belongings to his new residence. When he arrived for the first day of work, he was asked to sign an "agreement" restricting his right to compete with the employer should he leave the firm. Having already invested a great deal in the move, the employee felt he had no choice but to sign the contract. When his employer tried to enforce the provision, the court concluded that the agreement not to compete was not a freely bargained-for condition of employment and was therefore unenforceable.

- Include confidentiality and nondisclosure provisions. The employee should agree not to disclose trade secrets and confidential information obtained from the employer during the course of employment. The provision should specifically include trade secrets licensed to the employer by third parties, such as software suppliers. Confidentiality and nondisclosure agreements, when carefully and consistently enforced, place employees on notice that their jobs might involve trade secrets, and encourage prudence.

- Protect trade secrets and confidential information through covenants not to compete. Such agreements prevent a former employee with access to sensitive proprietary information from competing with or working in the same line of business as the former employer within a given geographic area for a given period of time. It prevents employees from appropriating confidential information to start their own businesses or from disclosing trade secrets to any new employer that might be in competition with the former employer. It also prevents other firms from "buying" confidential information by hiring away competitors' employees.
- Make sure the employment contract transfers to the employer the rights to all works produced by employees in the course of their duties. Copyrights to such works belong to the employer unless the employment contract says otherwise. But questions may arise as to whether an individual is an "employee"—under the direct control and supervision of the employer—or an independent contractor, and whether work performed by an employee is within the scope of his or her employment. The employment contract should spell out the answers to these questions.

In one case, the CIO of a large firm hired an independent contractor to develop software for use by the company. Unfortunately, he failed to have the contractor sign an agreement transferring exclusive rights to the firm. Within two months after the software had been delivered, the contractor had licensed the same program to one of the firm's chief competitors—at a lower price.

- Be careful when renegotiating employment contracts with existing employees. A company should consult legal counsel to determine whether the state law requires that additional consideration be provided. Consideration is something of value given in exchange for a promise. The consideration for prospective employees is that they will be employed and will receive a given salary and certain benefits, in exchange for signing the contract and agreeing to be bound by its terms.

Some jurisdictions have held that continued employment alone is not adequate consideration for existing employees required to sign employment contracts containing restrictions. In such cases, employers should provide some benefit, such as a cash bonus or a raise, in exchange for signing the contract.

Make sure that departing employees submit to an exit interview. During the interview they should be reminded of contractual obligations: specifically, the importance of maintaining the secret status of all confidential information and trade secrets. Employers should also require departing employees to sign a termination agreement acknowledging obligations and restrictions in the employment contract. Employees' unwillingness to sign such an agreement should raise doubts about whether they will comply with the contract.

Obligate consultants and others to protect trade secrets and copyrighted material. Consultants may have access to software and other information and technology that a user has licensed from a supplier. The CIO should obligate these individuals and companies to respect trade secrets and copyright restrictions on such technology.

The following parties should be subject to confidentiality agreements:

- The user's consultants and other independent contractors with access to trade secrets and copyrighted materials licensed by the user from a supplier;
- Maintenance personnel for other software and equipment who have access to the supplier's software at the user's site;
- Partners with the user in collaborative product development, systems integration, and marketing;
- Distributors of the user's products that may have access to the supplier's trade secrets and copyrighted materials;
- The user's customers, clients and licensees that may have access to the supplier's trade secrets and copyrighted materials; and
- Potential investors who may conduct reviews of the user, including a review of its licensed technology.

Protecting suppliers' confidential information and copyrights is critical to maintaining competitive advantage and avoiding costly litigation. IS executives concerned about their own and their suppliers' technologies must take every precaution to ensure that secrets remain secrets. CIO

Tobey B. Marzouk, is a partner at the Washington law firm Marzouk & Parry, which specializes in counseling software and computer users and vendors in contractual and litigation matters.

Examples of Trade Secrets

- *Discoveries and inventions*
- *Ideas and concepts*
- *Software (object code or source code), regardless of the phase of development*
- *Software documentation, including flow charts and block diagrams*
- *Designs, drawings and models*
- *Internal specifications and testing procedures*
- *Data and databases*
- *Novel techniques and procedures*
- *Marketing, research and development plans*
- *Certain kinds of customer lists*
- *Bidding policies and procedures*
- *Miscellaneous marketing information concerning finances, pricing policies and price lists*

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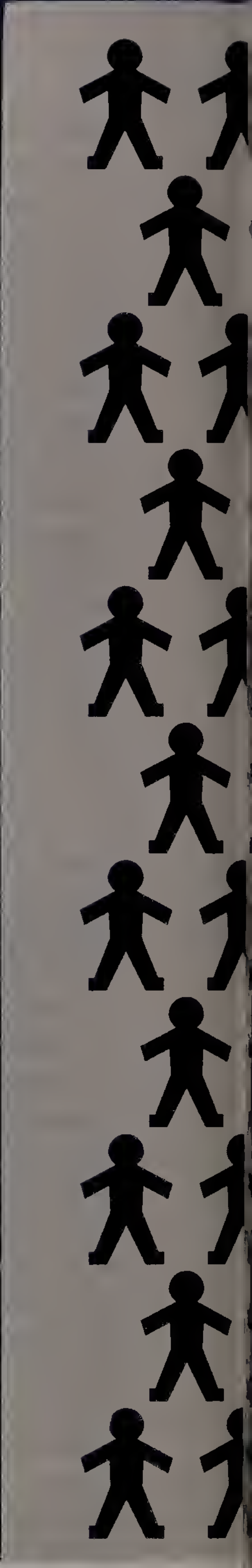

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> Joyce Wrenn,
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CIO

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A Stitch In Time

When an overwhelmed clothing-maker felt that its business and manufacturing processes needed some taking in, it used a data-management system to perform the alterations

Third Street Sportswear Manufacturing Inc. does custom work—sweats for major universities, T-shirts for corporate America. Everything is made to order, so the company might have 30 or 40 different styles per day on its manufacturing floor in Ozark, Mo. What with the fabrics, zippers, pockets, sizing, logos, shipping, inventory, time and labor allocated for each, "we're working off 3,000 variables at any given time," said co-owner Brad Thomas.

Calculating the cost per garment involved negotiating a maze of tables, with ample room for error at every juncture. And since employee compensation is based on the quantity and complexity of the articles produced, "it was taking as long to pay our workers as it was for them to get the work done," Thomas recalled.

Managerial types, instead of running the business, had their noses buried in pricing charts, churning out numbers. There was little time for the big picture—or much else. Something had to give. Thomas was admittedly computer-shy at first. "I was a little scared," he said. "But I knew my business and I knew how to make money, and I was smart enough to know that I needed a computer to put it all together."

The problem was how. Since Third Street employed graphics for printing, it went with Macintosh and was steered toward Helix Express from Helix Technologies of Prospect Heights, Ill., for its open-ended databases. The program was fine for normal business activities such as invoicing and commissions, but Thomas soon discovered that the company's in-house programmer and off-the-shelf software couldn't assimilate all the required functions. So Third Street called in the cavalry in the form of Antley Business Systems Inc. (ABSI) in Minneapolis to create a custom data-management system.

Now when an order comes in, it is entered into the system, which generates one electronic document that eventually will include all labor and materials for each article of clothing. The program scans inventory to determine what fabrics and notions must be purchased and produces size and content sew-in labels for the order. The computer then determines which machines will be used to fill the order and how much time each machine will be required to operate. The system even summarizes conditions on the manufacturing floor—such as which machines are overloaded and which are underused—allowing managers to schedule work and balance production so that orders requiring different machines can run concurrently. At each stage of the process, data is input into the system manually, and each department generates a daily status report so that customers calling in can be updated on their orders' progress.

The result has been streamlined operations. In the four years since Third Street installed the system, business has increased by 100 percent, according to Thomas. It now produces close to 1 million garments a year and boasts annual revenues of $5.5 million.

Yet, thanks to the system, the company still has virtually the same size staff. "When we started computerizing in 1989, we had three ladies in the front office," said Thomas. "Now we've doubled our business, but we haven't doubled our staff. We still have the same three ladies."

Only now those ladies—and everyone else—solve their problems using Mac technology. "Our system is set up so that you don't need previous computer experience," said Thomas. The Mac, Helix and ABSI data-management systems were a perfect fit for Third Street. "With the custom system, we don't have to go back to hard data," said Thomas. "The information is already in the system. We just go in and modify. On the user level, procedures may not change at all."

–Melanie Menagh

Melanie Menagh is a freelance writer in Brooklyn, N.Y.

VITAL STATISTICS

Organization: *Third Street Sportswear Manufacturing Inc., Ozark, Mo.*

Application: *Multiple functions, including order processing, inventory, manufacturing, scheduling, payroll*

Sponsor: *Brad Thomas, co-owner*

Technologies: *Macintosh with Helix Express and a custom data-management system designed by Antley Business Systems Inc.*

Scope: *Management, manufacturing supervisors, warehouse staff, salespeople*

Objective: *To expedite price-per-garment calculations, schedule manufacturing production and integrate various company functions into a single system*

Payoff: *Output and revenue have doubled in four years, and the number of front-office staff members has declined slightly. More-efficient workforce*

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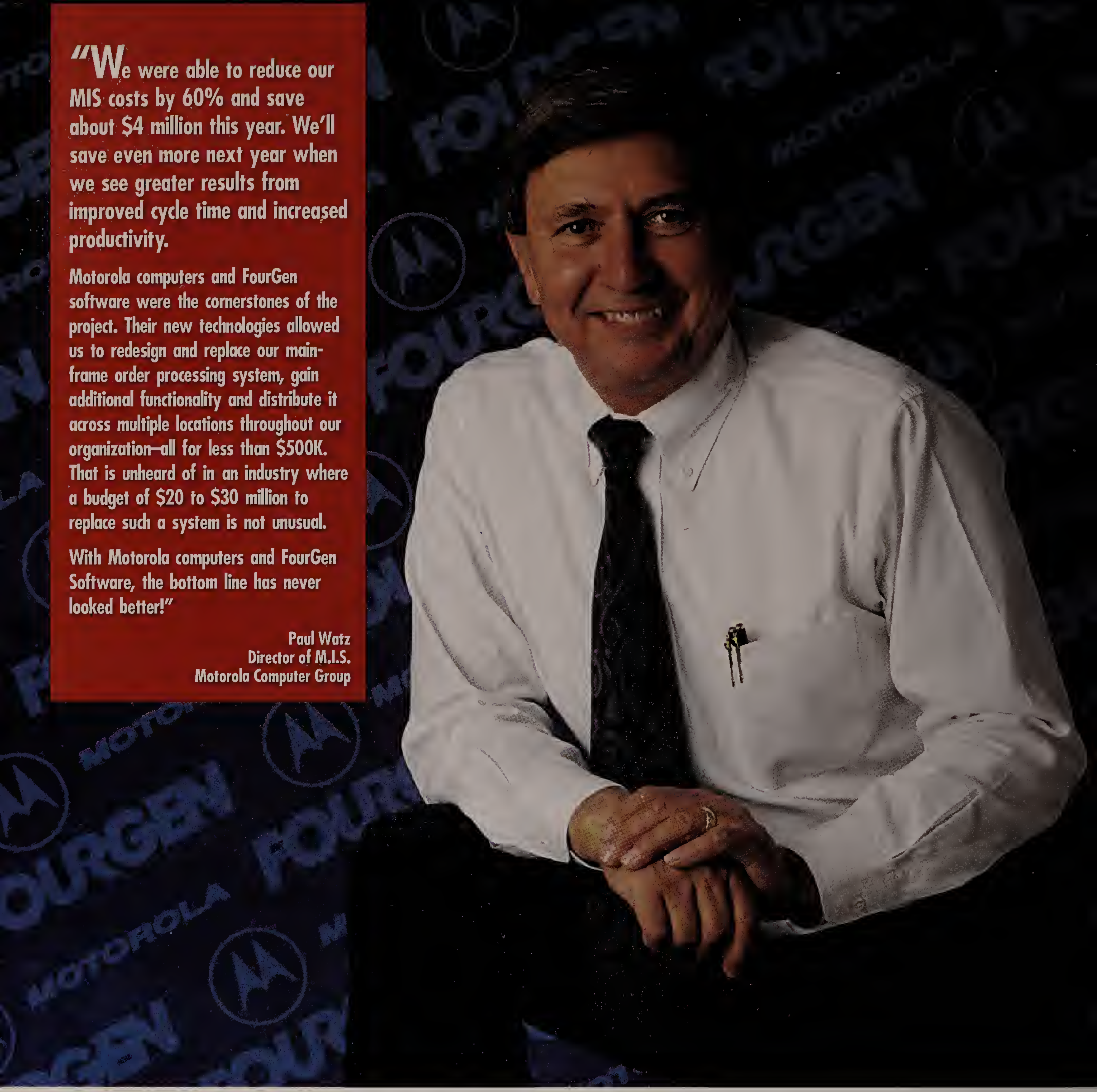

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